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June/July 1986
$2.50 U.S.
ISSN 0739-8018

commodore
power/play

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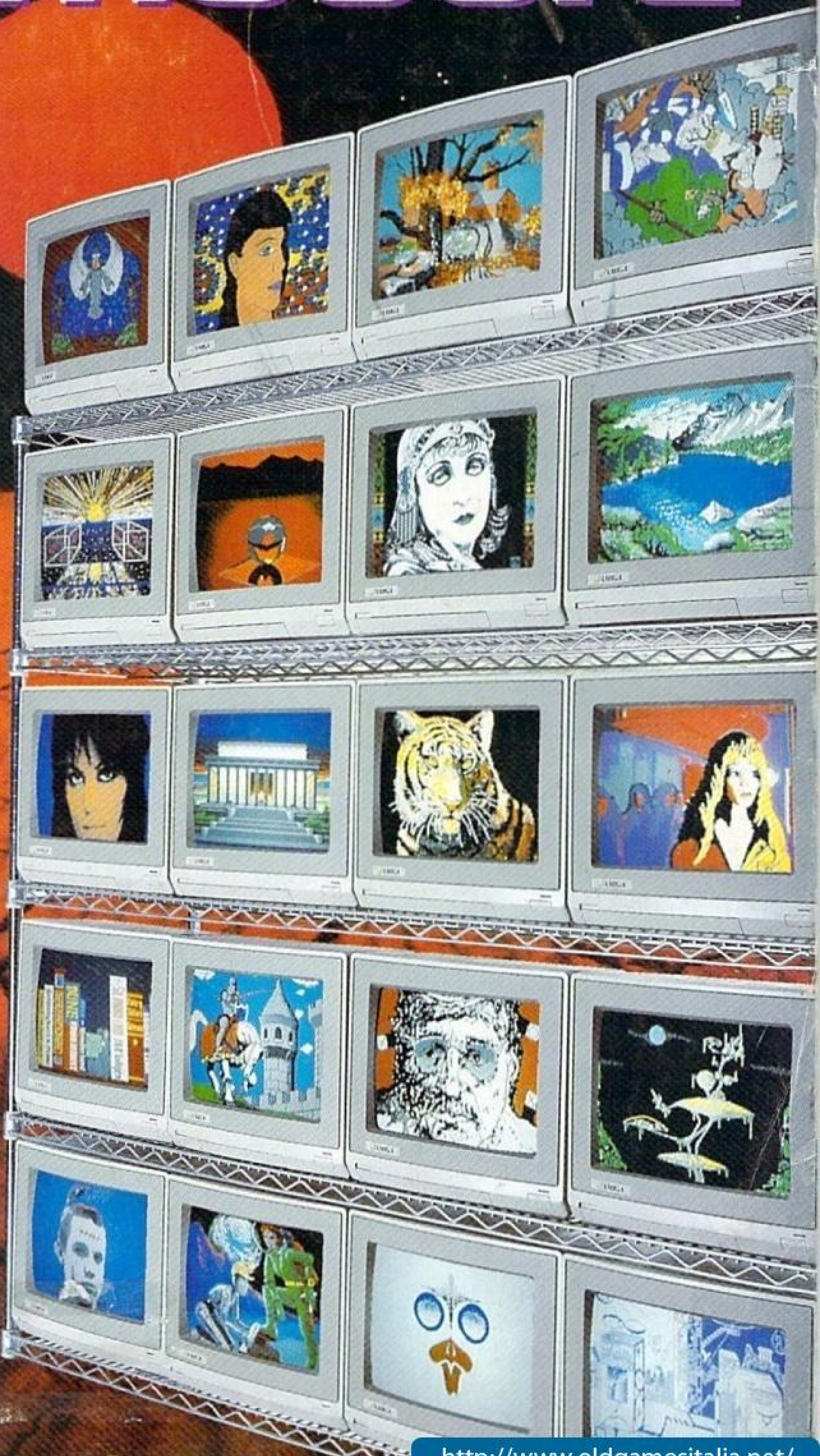

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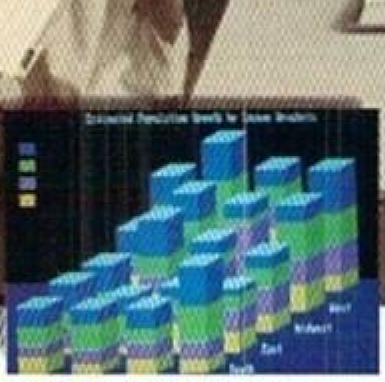

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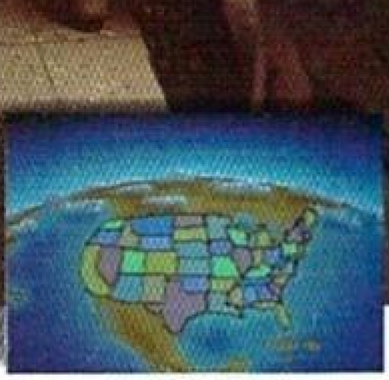

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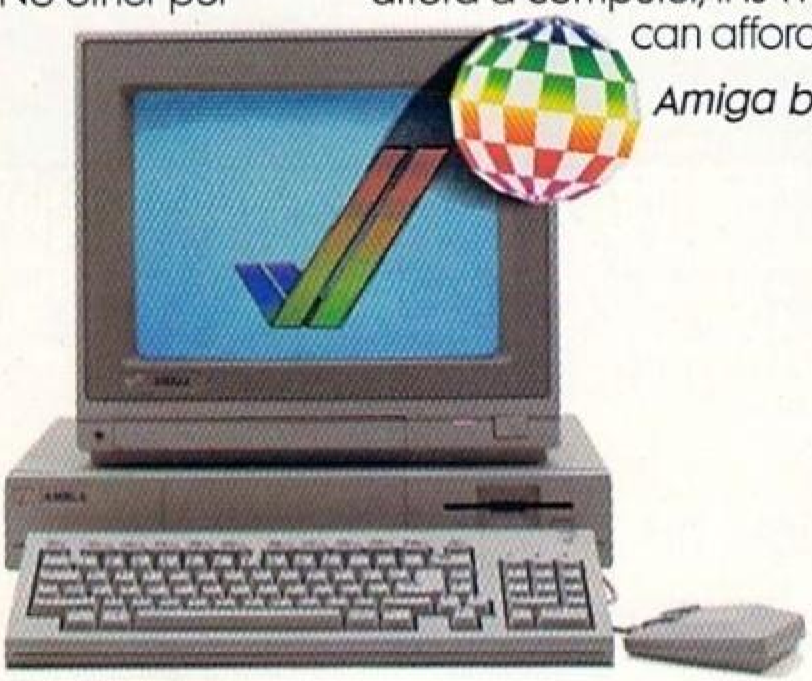

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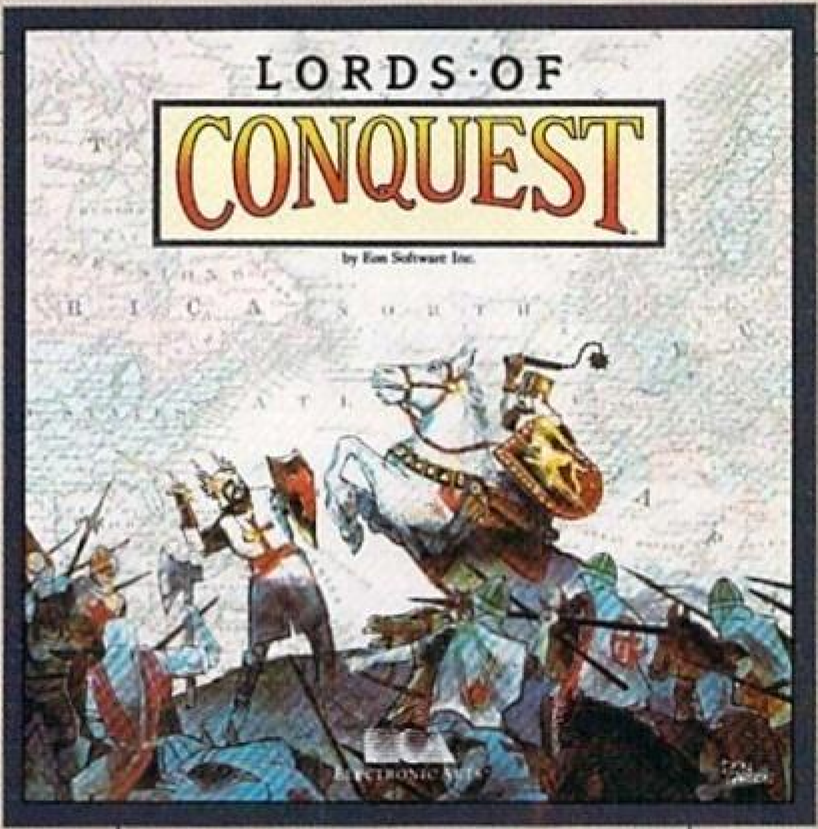

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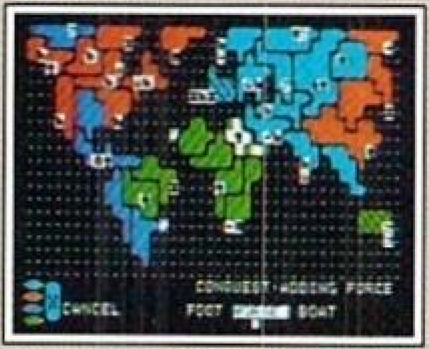

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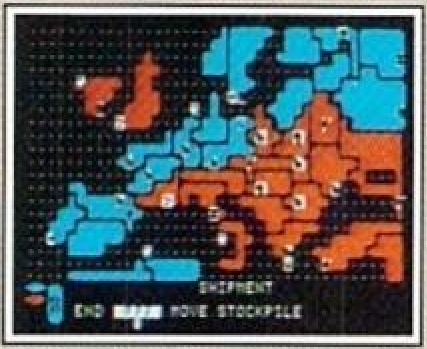

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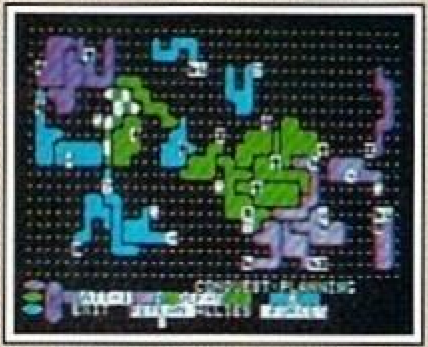

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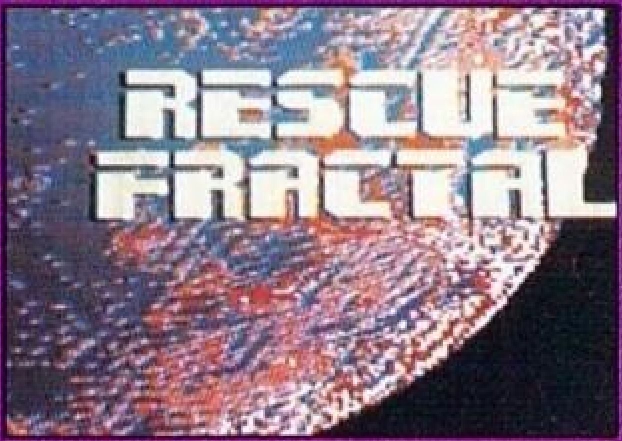

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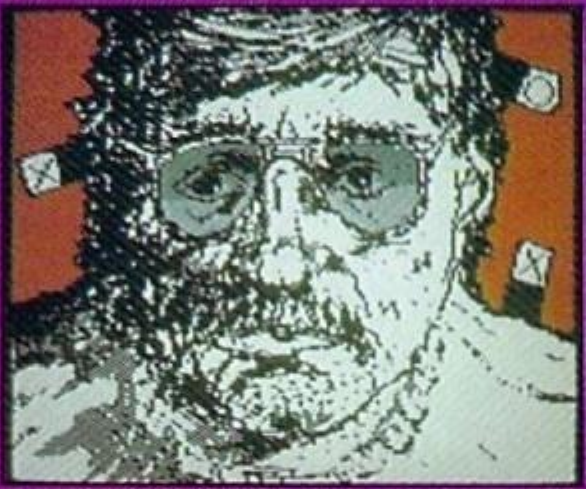

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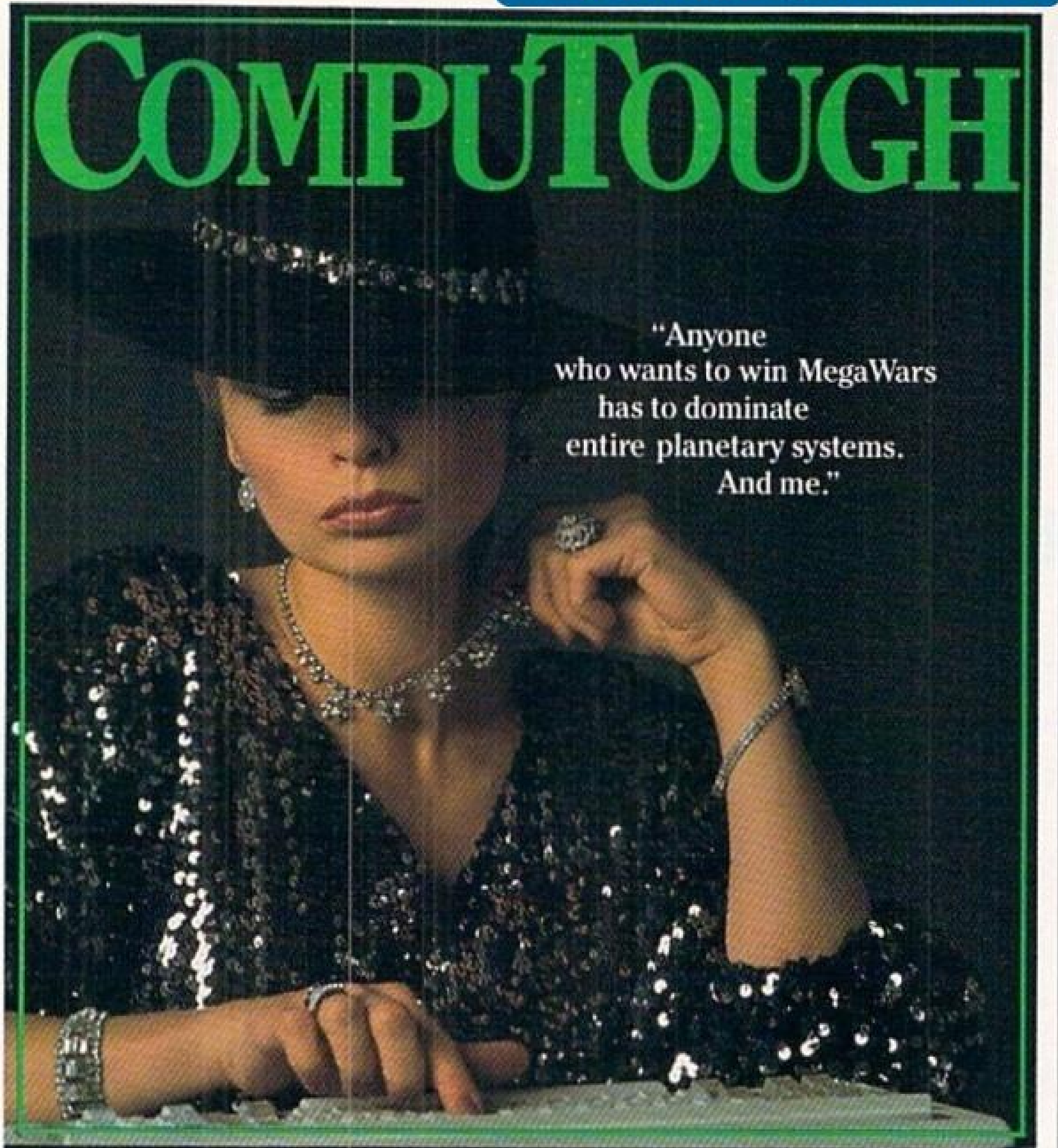
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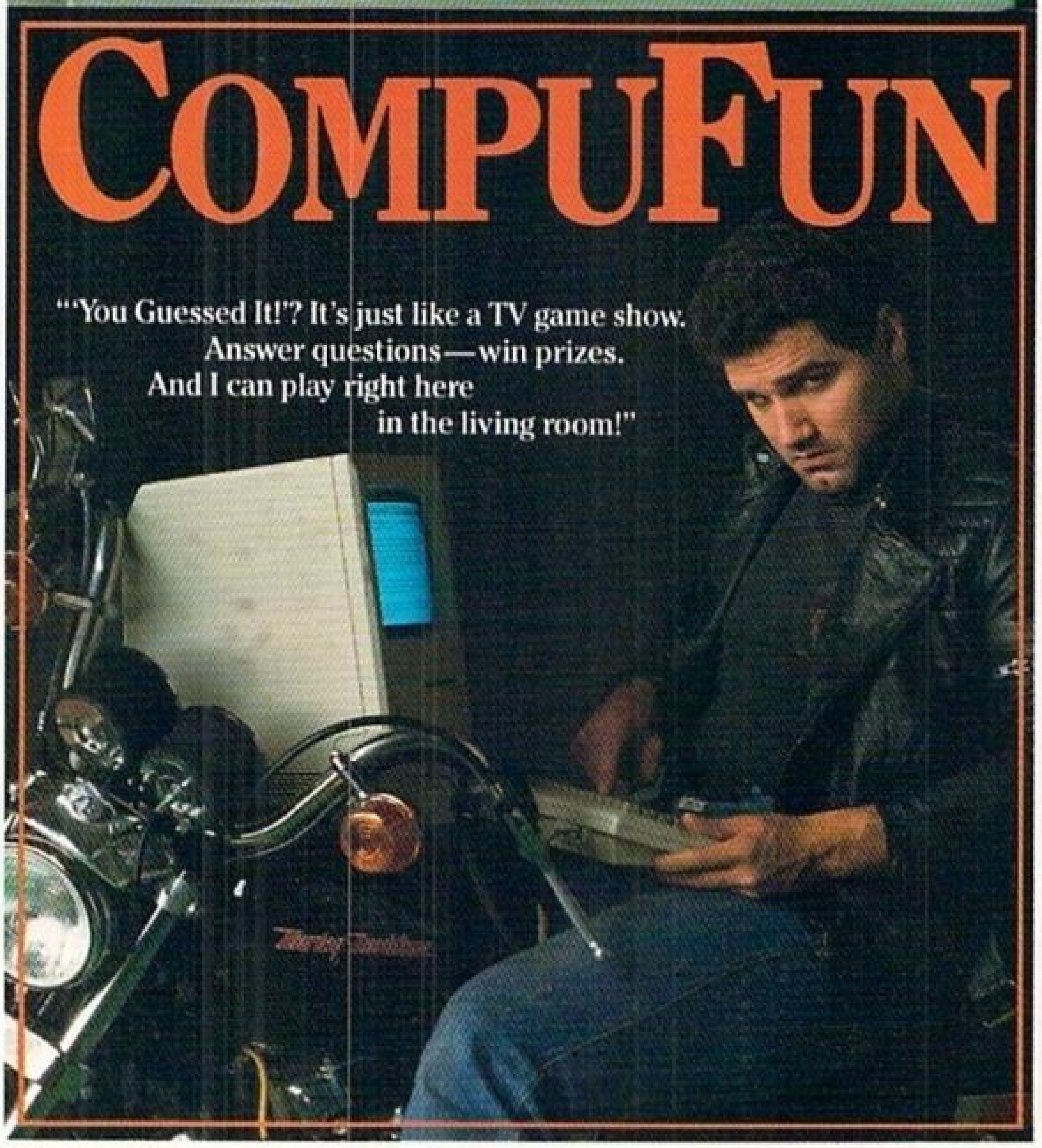
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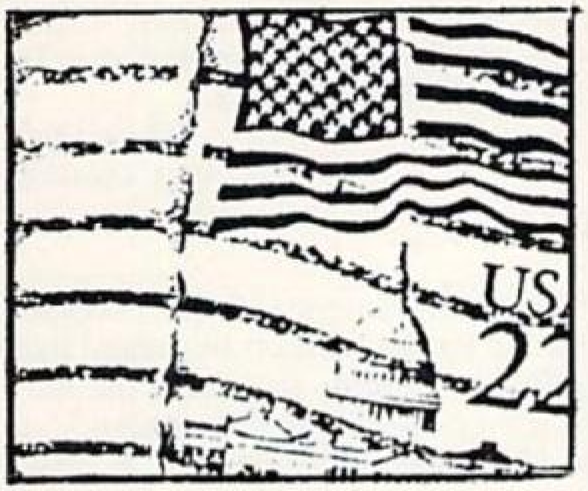

Hail for the PET and 64

To the Editor:

I recently ran across "Hail for the PET and 64/Spider Race" in the September, 1985, *Commodore Power/Play* Letters section. The "Spider Race" program runs in the 64 mode on my 128, but it should be brought to the attention of other 128 owners that 7.0 BASIC abbreviations of keywords are not the same as for the 64. In particular, the POKE abbreviation on the 64 is P shift O and on the 128 is PO shift K. I climbed the walls figuring that out.

Douglas Flagg
Athol, Massachusetts

Word Processor as Spelling Aid

To the Editor:

I use the spelling checker on my word processor as an educational aid for my elementary school children. I encourage them to bring home a list of their spelling words, which I then enter into my word processor's dictionary. Once this is done, I recite the words as my child types them in using the word processor. We then check the words using the spelling checker. Wrong words are highlighted.

This helps in several ways. First, the spelling test is more fun and meaningful, and secondly, the child learns the computer keyboard.

Richard L. Eberhardy
Green Bay, Wisconsin

128 Key Repeat

To the Editor:

The Commodore 128 has auto repeat keys as a default as soon as you power up. A lot of the time I find that when I am typing at a reasonably quick pace, I get double characters due to the built-in repeat feature. To

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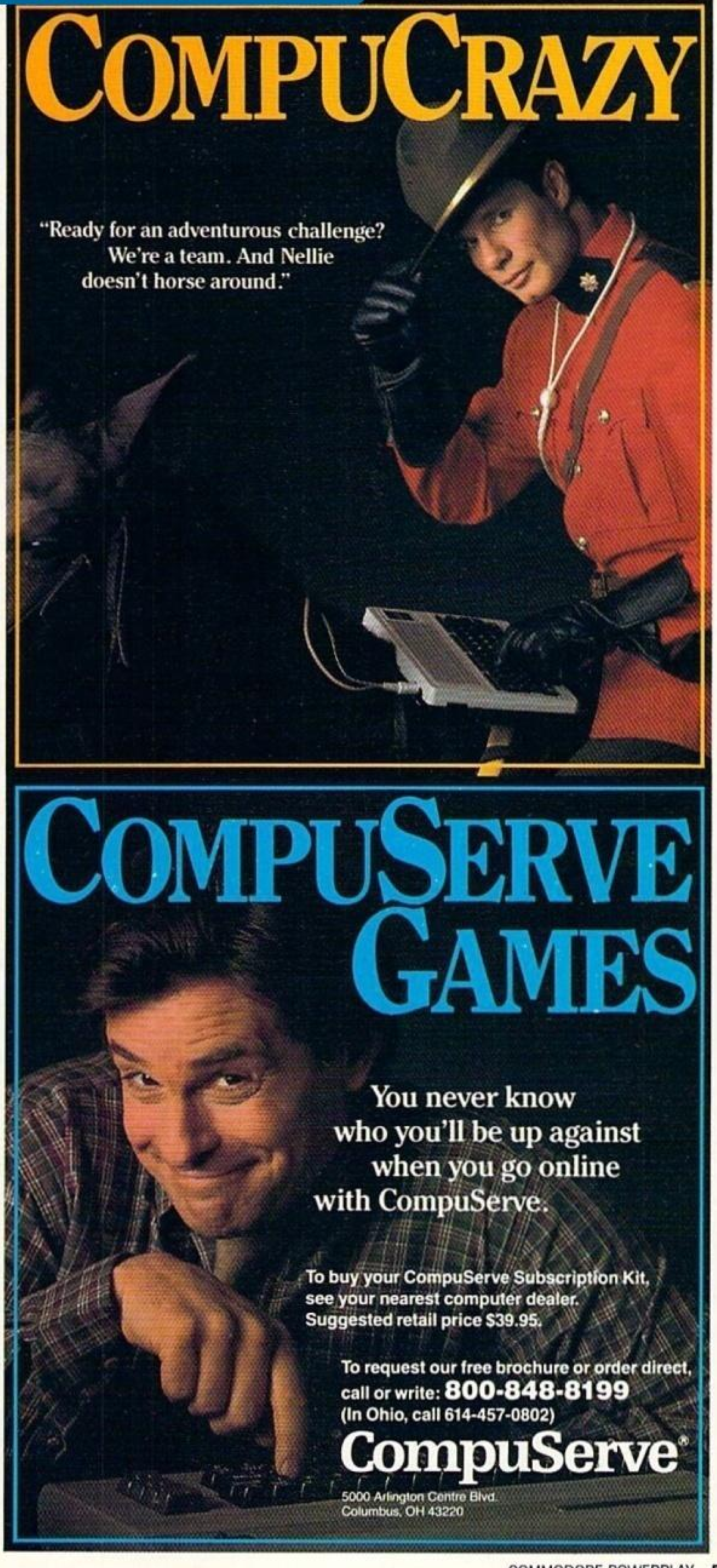
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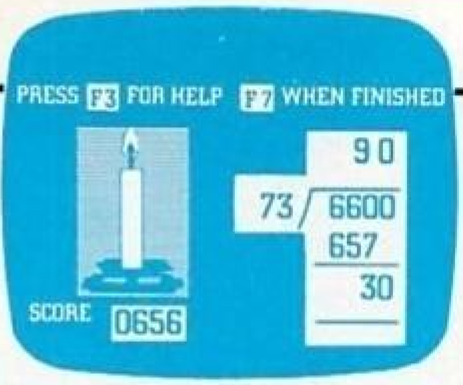
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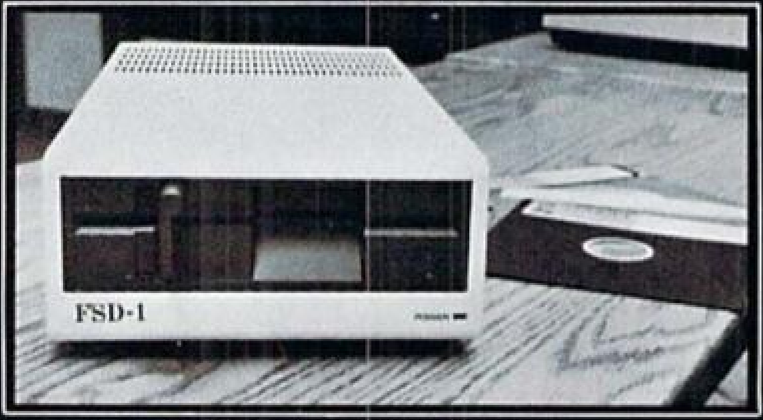

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LETTERS

disable the auto-repeat, simply type POKE 2594,64. This eliminates the chance of typing double characters. To re-enable the repeat, type POKE 2594,128.

Mort Adler
Winnipeg, Canada

Software Piracy

To the Editor:

There is so much rhetoric from the software companies regarding the profit erosion caused by piracy that perhaps something should be said concerning the horrific manner in which they conduct their business.

Software is hype-advertised and overpriced. It is deliberately produced with the knowledge that the cost-inflating protection schemes will damage hardware. What gives them the right to damage our hardware while they hide behind disclaimers? It is an established fact that owners of software have a right to reproduce their purchases, but the software companies (having already raped the consumer economically) now produce software requiring "dongles" to operate them. In order to use software in more than one location (for example, home *and* office), multiple units must be purchased!

In many cases, software can live up to the hype that surrounds it. In many more cases, it cannot. How are consumers protected from sloppy, cumbersome software? It is so grossly overpriced that it is too expensive to learn by trial and error which is garbage and which is not.

The law protects the companies from those of us who are not pirates from becoming pirates . . .but who protects us from the companies? We are getting raped too often . . .there ought to be a law!

George Zimmerman
Lebanon, Pennsylvania

Old 64/New 1702

To the Editor:

In the January, 1986, issue of *Commodore Power/Play's* Letters section, a letter was published from Carl E. Grohs of Virginia. It made mention of a problem that many old, long-time users of the 64 have, i.e., hooking up an old 64 to a newer 1702 monitor. He made mention of an improved cable from Bytes & Pieces, "Hook up Your Old 64 to the New 1702, You Won't Believe the Difference!" Please send me the information needed to purchase this product and you'll have a friend for life.

Frank Agosta
Brooklyn, New York

Bytes & Pieces, of Wauwatosa, Wisconsin, may be reached at 414-257-1214. Retail price for the cable is $24.95.

VIC 20 Provides Word Processing "Eyes"

To the Editor:

Stacey Felber Lusius is blind. She's also heavily into word-processing. How is that possible? It's easy—with a little help from two word-processing "associates": her husband and her VIC 20!

Severely visually-handicapped since birth, Stacey has

Continued on pg. 8

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Scenery Disks

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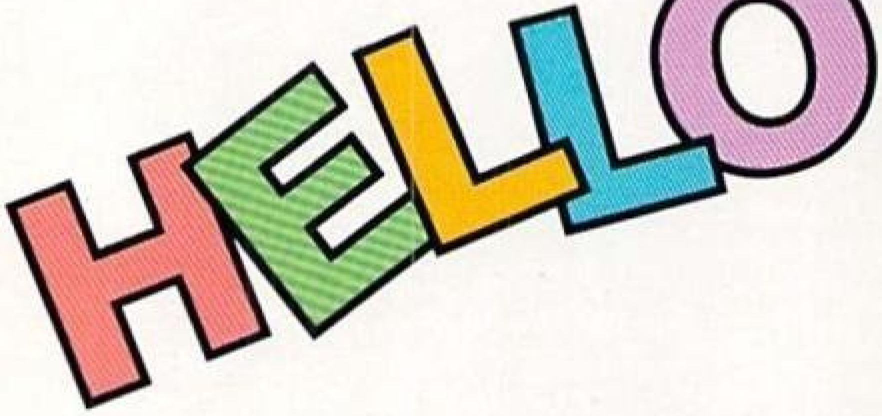

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LETTERS

marginal vision in one eye until a recent accident destroyed that eye's functioning. Now completely blind, Stacey continues to be an avid writer of poetry and prose, just as she's been since childhood.

"I've always enjoyed processing words," she explains. "My Perkins Braille writer (machine which punches Braille dot letters into thick paper) and I have been nearly constant companions for years! After my recent accident, I asked my husband, Leland, if he could rig up our VIC 20 to help me."

Leland, a computer technician (and legally blind himself), is currently writing a VIC 20 program to provide Stacey with audible cues—beeps and other sound effects—in response to her keyboard commands.

"I'm already using the program for writing letters," she explains. "All the different beeps and other effects might sound funny to someone who's never worked with such a program, but not to me."

A carriage-return "bell," for example, sounds when Stacey has keystroked to the VIC 20 screen's right-hand "margin." Should she continue keystroking without inserting a return, the program plays a short rendition of the old "Dragnet" theme song: "Dum de dum dum. . . ."

A newly-purchased daisy wheel printer nicely complements Stacey's word-processing system, with quality hard-copy output. When she's finished keystroking a document (poem, letter, whatever) and she wishes to print it out, she keystrokes a print command and hears the VIC 20 proclaim, "Ta-dah!"

"Now that Leland has gotten the bugs worked out of the program," Stacey explains, "he's going to add a few bells and whistles that I've asked for. Like, I want to be able to monitor and control pagination, so I can create multi-page documents—like a novel, maybe."

When completed, Leland's program will enable Stacey to hear, and thus to verify, every keyboard command she enters. She'll thus be able to operate the VIC 20 as a word processor almost as easily as if she could see the screen.

"And you ain't heard nothin' yet," Stacey parodies the King's English (her grammar and vocabulary are the envy of many sighted friends). "Leland and I will soon be acquiring a voice synthesizer, and then watch my VIC 20 and me go to town!"

Stacey and Leland also anticipate buying an Amiga in the not too distant future. "Not that the VIC 20 can't do the job," Stacey hastens to add. "But an Amiga could do it even *better*."

Indeed, it seems Stacey's word processing adventures have only just begun. "Being blind only makes it more challenging," she remarks, adding with a grin, "I've never been one to back away from challenges!"

Michael Herbert Shadick
Minneapolis, Minnesota

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INSERT ADDITIONAL TEXT IN THREE WAYS. One character at a time, "cut and glue" for whole blocks of text, or by adding a blank line to your text.

DELETE TEXT IN THREE WAYS. One character at a time, delete partial lines or delete entire lines of text.

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Flight Simulator II Joystick

Microcube Corporation has released the MicroFlyte ATC joystick for use with SubLogic's **Flight Simulator II.** The joystick allows for proportional control to give the user fuller control of the aircraft. The joystick is controlled by a software driver that is booted up before the **Flight Simulator** disk. It retails for $59.95. (Microcube Corporation, P.O. Box 488, Leesburg, VA 22075)

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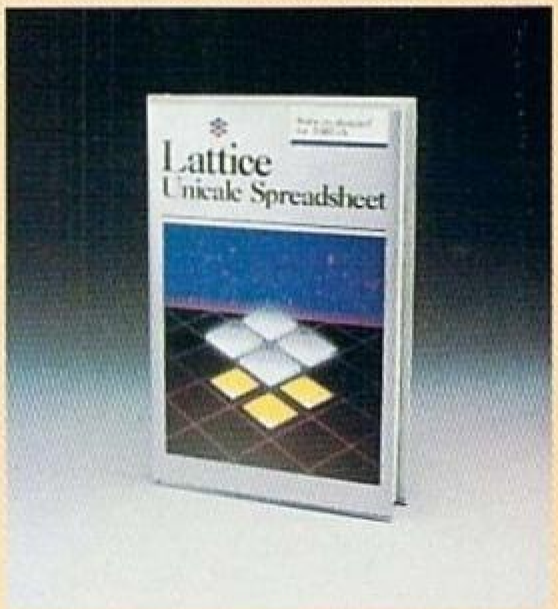
Amiga Utilities



Lattice has released six utility programs for the Amiga: **Lattice Text Utilities, Lattice Make Utility, Lattice Screen Editor, Lattice dBC III Library, Panel,** and **Lattice MacLibrary.**

Lattice Text Utilities is a collection of eight programs which provide a language-independent set of tools to examine and edit text files. These utilities can be used on program source code or files produced by a text processor.

Lattice Make Utility rebuilds systems with a single command. The automated product generator, similar to UNIX, can also be used to update text, spreadsheets, or perform any executable commands.

Lattice Screen Editor provides a fast, flexible multi-window environment that gives programmers standard editor functions as well as special features such as an error-tracking mode, three assembly language input modes, and pattern searches.

Lattice dBC III Library contains more than 70 C functions to create, access and update files that are compatible with **dBase III.**

Panel is a screen design and screen management tool to use custom data entry validation, pop-up help messages and menus, and provides full user editing of data entries.

Lattice MacLibrary consists of more than 60 C functions to aid in implementing screens, windows, and gadgets. (Lattice, P.O. Box 3072, Glen Ellyn, IL 60138)

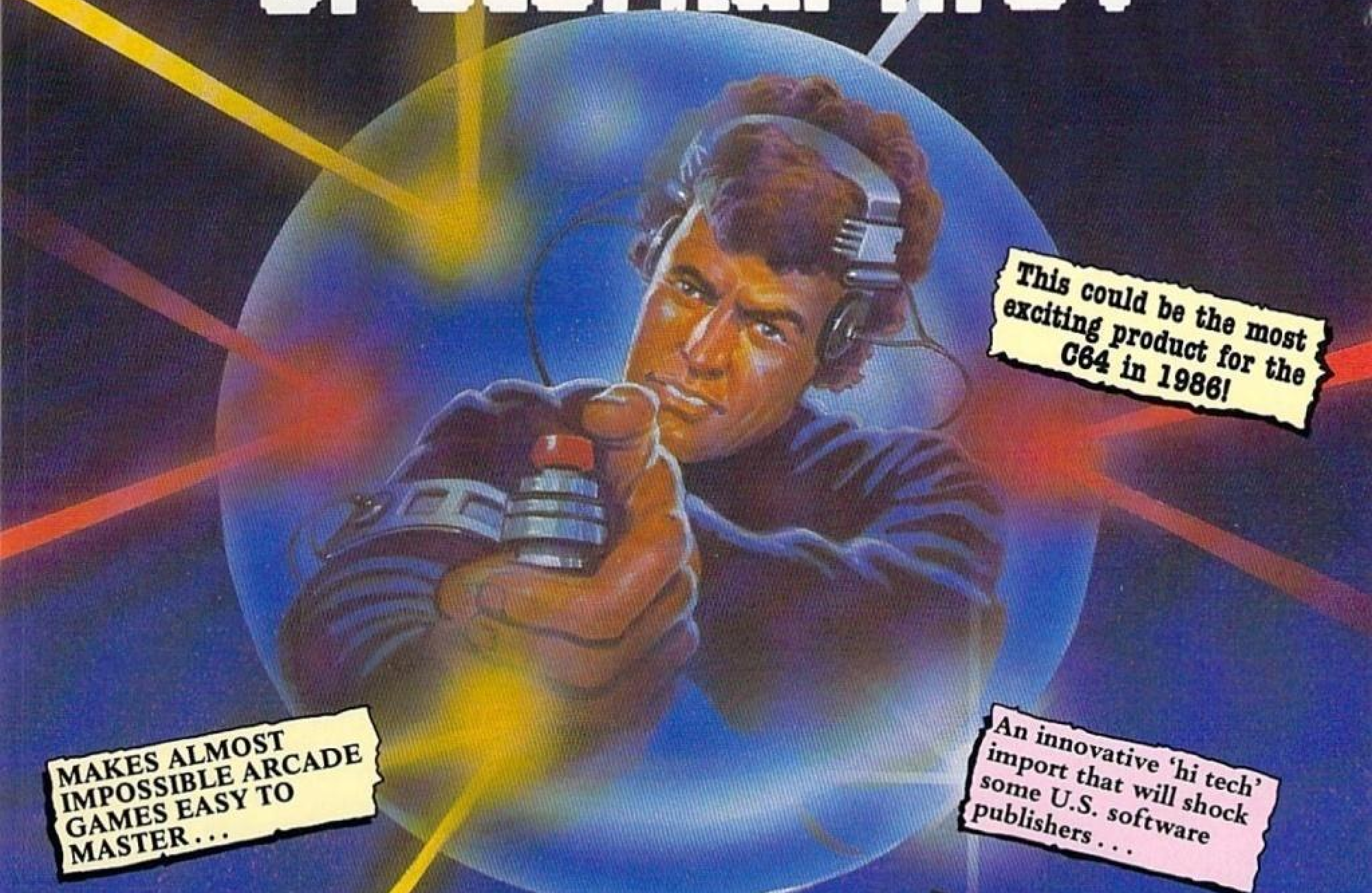
School Edition of *The Newsroom*

Students can write, design, illustrate and print their own newspapers on the Commodore 64 with the new school edition of **The Newsroom,** released by Scholastic. First developed by Springboard Software, **The Newsroom** combines word processing and graphics. Published by Scholastic for grades 5 through 12, it includes step-by-step learning activities and supplementary teaching materials.

The Newsroom package includes one program disk (with backup), one double-sided graphics disk (with backup), and supplementary materials. These include a User's Handbook, Reference Guide, Student Guide, Teacher Guide, and Tutorial. Six basic units of **The Newsroom** guide students from the draft stages of stories to printed, illustrated newspapers.

Scholastic's school edition of **The Newsroom** retails for $74.95. A joystick or KoalaPad and modem are optional. (Scholastic, 730 Broadway, New York, NY 10003)

The Infinity Machine holds the secret of eternal life!



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Q: Sounds difficult.

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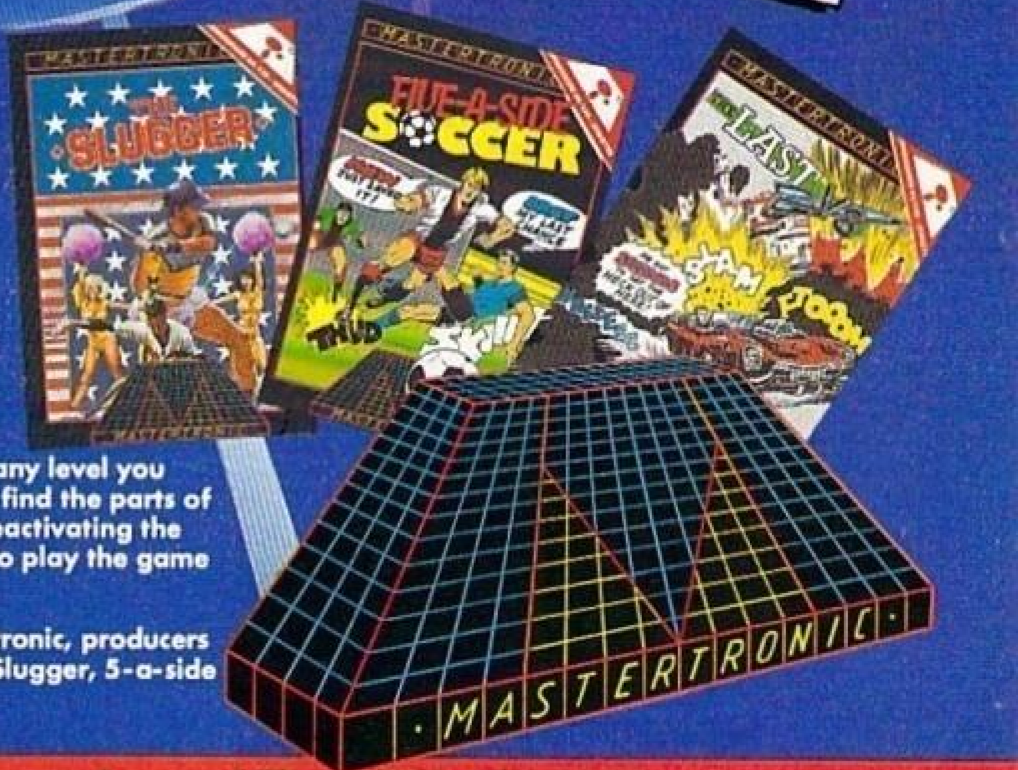
Q: How does it work?

A: All the thousands of published action and animated games that use a programming device called "Sprite collision detection", are disabled by the Infinity Machine and the Infinity Shield protects the player from being shot or crashing!

Q: What can I now do in a game that I couldn't before?

A: Activating the cartridge enables you to:– "Enter a game at any level you choose". "Explore all the areas and levels of the game and find the parts of the game you didn't know existed without being killed." Deactivating the cartridge at any point you choose enables you to continue to play the game totally normally.

The Infinity Machine is brought to you at $24.99 by Mastertronic, producers of incredible value Commodore 64/128K software such as Slugger, 5-a-side Soccer and The Last V8 all available at $9.99.



Contact the Mastertronic hot line for the secret of eternal life on 301 695 8877

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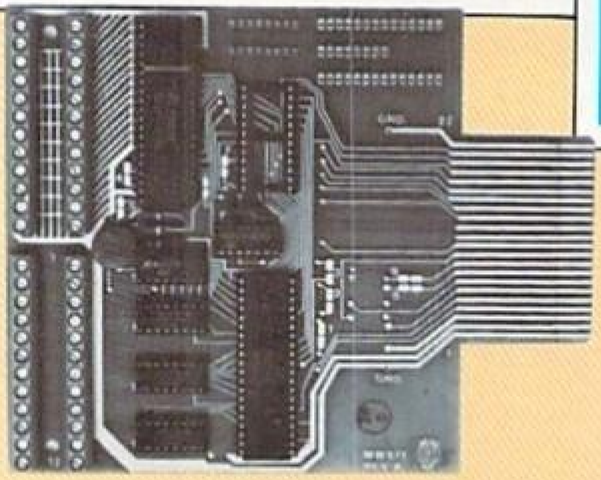
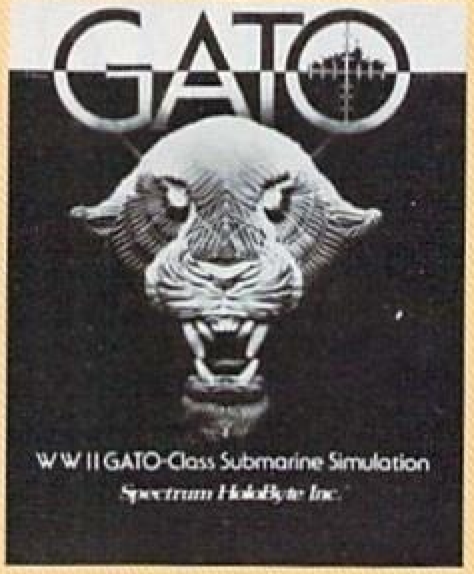


Input/Output Board

The MW-611 is a general purpose input/output board for the Commodore 64 that can digitize 16 analog inputs and provide 16 high current discrete outputs from the expansion port. The resolution of the 16 analog inputs is eight bits, and the outputs can switch up to 30 volts at 0.3 amps. The I/O board also provides one analog output and an EPROM socket for user programs. The conversion rate is 100 microseconds.

Applications include computer-operated closed-loop control systems, temperature control, gas chromatographs, heating, and air conditioning control. Also available are programs for a low-speed digital oscilloscope and data acquisition, plus a thermocouple interface board. (Micro R & D, 3333 S. Wadsworth A-104, Lakewood, CO 80227)

Submarine Simulation


GATO
WW II GATO-Class Submarine Simulation
Spectrum HoloByte Inc.

Spectrum HoloByte has released **GATO**, a World War II submarine simulation for the Commodore 64. The program includes eight missions, five difficulty levels and three ships. **GATO** retails for $29.95. (Spectrum HoloByte, 1050 Walnut, Suite 325, Boulder, CO 80302)

RAM Card for the Amiga

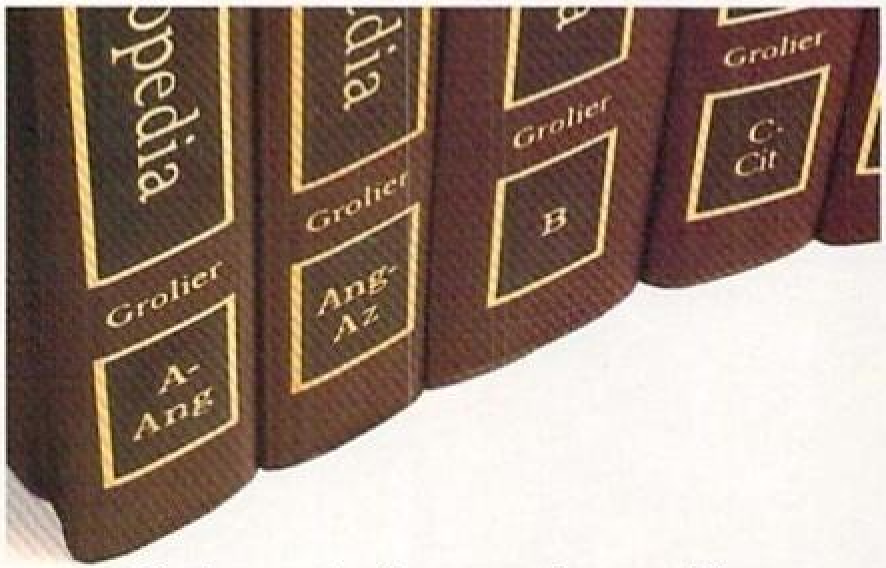
Starpoint Software has released a 256K RAM card for the Amiga. The card installs behind the front panel, expanding available memory for programs and graphics to 512K. Standard system architecture is used to insure compatibility with software and hardware. It comes with a one-year warranty, manual and schematics. The suggested retail price is $120. (Starpoint Software, 122 South Broadway, Yreka, CA 96097-2902)

Disk Cataloging

SuperCat is a disk cataloging system for the Commodore 64 that features 640 disk directories and over 5,000 program titles. **SuperCat** provides automatic entry from the catalogued disk's directory with selection, editing and cross-reference capabilities. An alphabetized listing of up to 5,000 titles is produced using a machine-language sort capable of sorting 1,000 titles in eight seconds.

The need for unique disk ID's is eliminated with **SuperCat**'s custom disk numbering system. Compact multi-column reports list disks and titles as well as disk labels. **SuperCat** provides complete display facilities, and a search utility locates any title in less than ten seconds for users who have no access to a printer. All orders include a backup copy.

SuperCat is available for $29.95 from Cornucopia Software, P.O. Box 2638, Portland, OR 97208, or by phone 503-293-3437.



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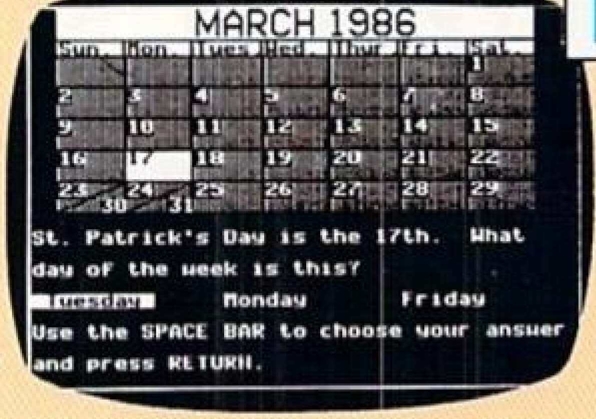

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MARCH 1986
Sun. Mon. Tues. Wed. Thur. Fri. Sat.
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 9   10   11   12   13   14   15
16   17   18   19   20   21   22
23   24   25   26   27   28   29
  30   31
St. Patrick's Day is the 17th.  What
day of the week is this?
 Tuesday       Monday       Friday
Use the SPACE BAR to choose your answer
and press RETURN.
```

Learn Calendar Skills

Gameco Industries has released **The Calendar** for the Commodore 64. **The Calendar** combines drills in calendar skills, an arcade-style reward game, and a program/student management system. It includes a choice of three lessons: days and months; seasons, special days and holidays; and using a calendar.

In lesson one, students choose to sequence or abbreviate the days and months. In lesson two, students are given information and must identify the appropriate season, special day, holiday, or month. In lesson three, students are shown a calendar and must use it to answer questions.

The Calendar retails for $39.95. Backups, class packs, and network packs are available. (Gameco, Box 1911, Big Spring, TX 79721)

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Education through Simulation

The Blue Chip Challenge allows students to experience the financial challenges of investing in real estate, stocks, and commodities. Students learn a basic finance vocabulary and the broad concepts that govern the financial marketplace.

The Challenge consists of three software packages for the Commodore 64: **Millionaire, The Stock Market Simulation; Baron, The Real Estate Simulation;** and **Tycoon, The Commodities Market Simulation.** Printed material includes a Flow Chart of Activities, Interview Guide, The Challenge Rules, Team Registration Form, Roster of Teams, Student Quiz, Quick Reference Guide for each of the three simulations, Glossary, and Team Award Certificates.

First, a faculty sponsor is chosen. This can be the classroom teacher, a teacher's aide, a parent volunteer, or any adult who can take the responsibility of setting up and supervising the activities. Introductory lessons, any optional activities such as films or field trips, and student interaction with professionals from the local community are arranged and conducted in preparation for the simulations. Student teams are then selected, with a maximum of 13 teams of two students each. A team registration form is filled out and posted for each team. The order of team play is determined by a lottery and posted on the registration forms. A separate lottery is held for each simulation.

Signing out diskettes by the first teams begins The Challenge. Team scores are recorded on the posted team registration forms. The steps are then repeated for the other simulations. And finally, awards are presented to the teams with the highest scores. (Blue Chip Software, 6740 Eton Avenue, Canoga Park, CA 91303)

Outline Processor for the 128 in CP/M Mode

Kamasoft has introduced **Out-Think,** an alternative for outline processing on CP/M computers. **Out-Think** classifies text into an outline structure which can then be accessed and altered. It hides details and focuses on how main ideas fit together. Levels of the outline can be collapsed off the screen, hiding them from view, and then expanded back into view for editing.

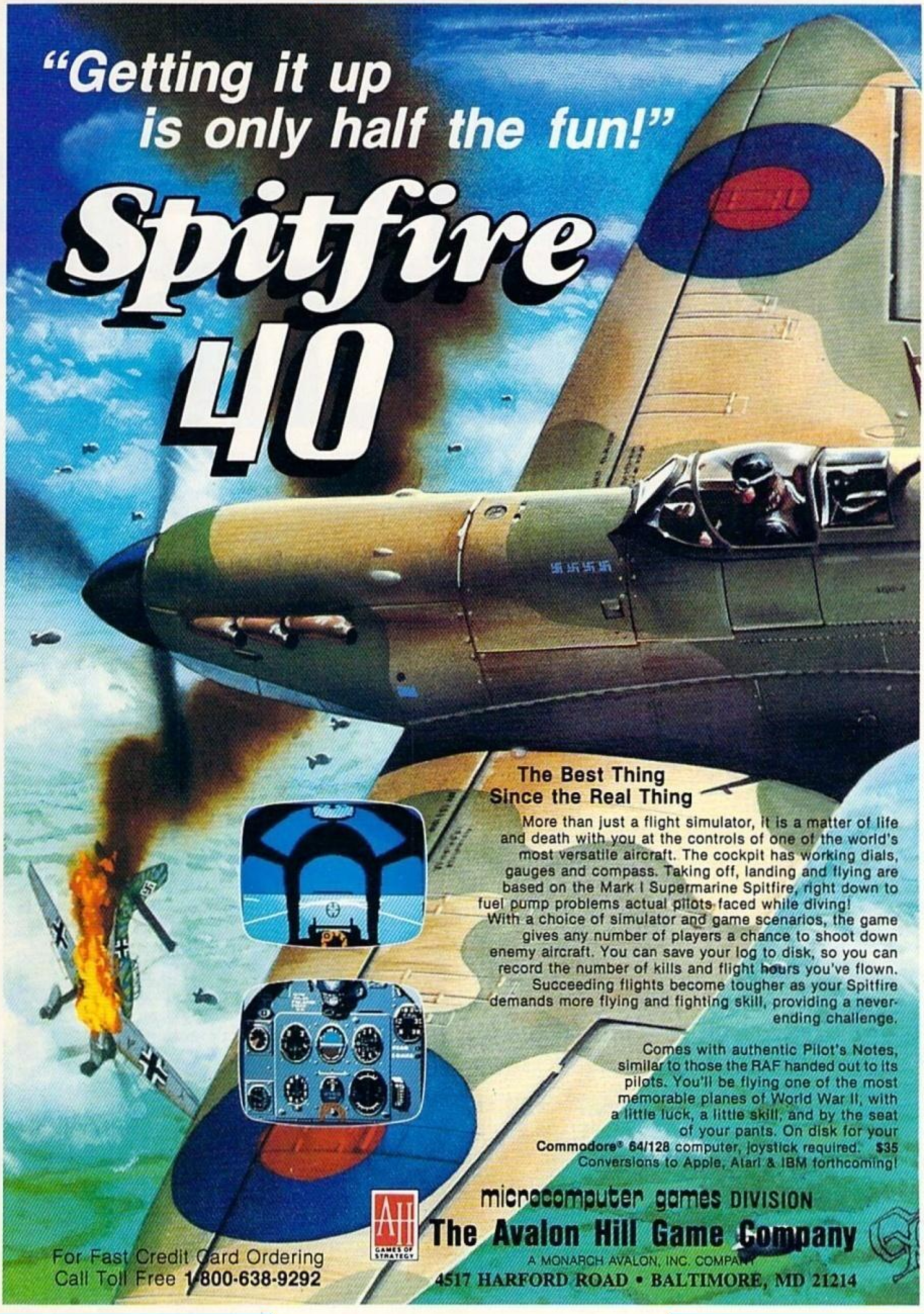
Out-Think offers a full-screen text editor for inserting and editing text in the outline. Copy and move operations are provided, including copying within and between outlines, and marking groups of titles in the outline for copying, printing, or deleting. Its directory reads and writes text files from most word processors. And it prints the outline with over 20 different formatting parameters, including headers and footers, page numbers, section numbers, and an automatic table of contents. Additional features include a built-in file manager, information retrieval by keyword, date and time stamping, and password security on outline files.

Suggested retail price of **Out-Think** is $49.95. (Kamasoft, 2525 SW 224th Avenue, Aloha, OR 97006)

More news on page 127

"Getting it up is only half the fun!"

Spitfire 40



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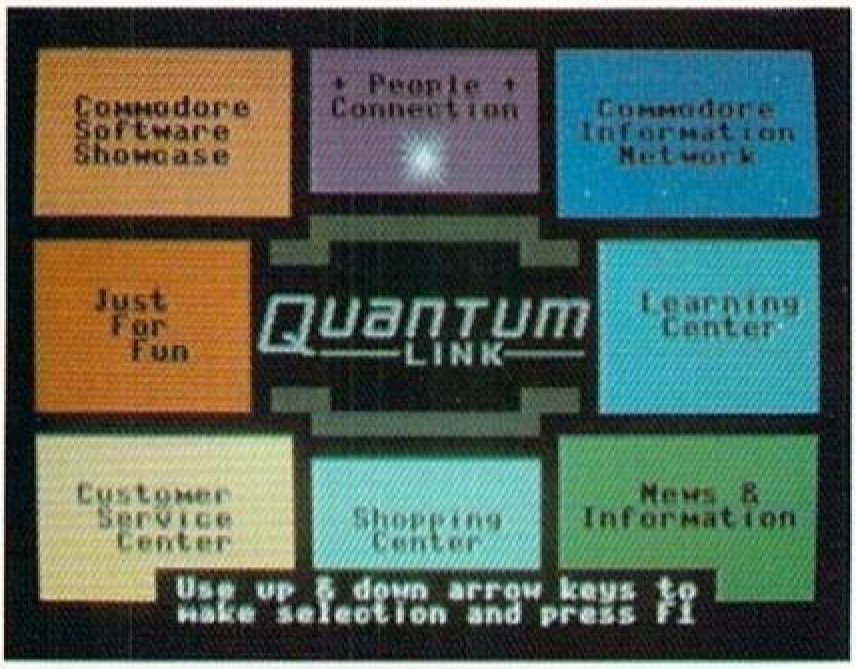
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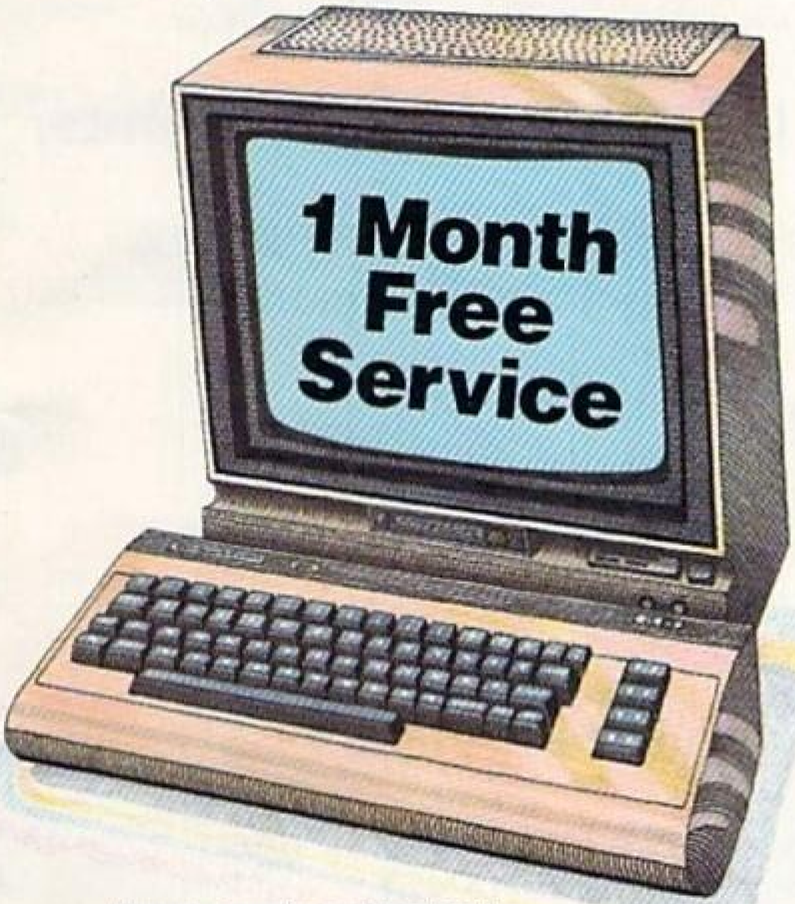

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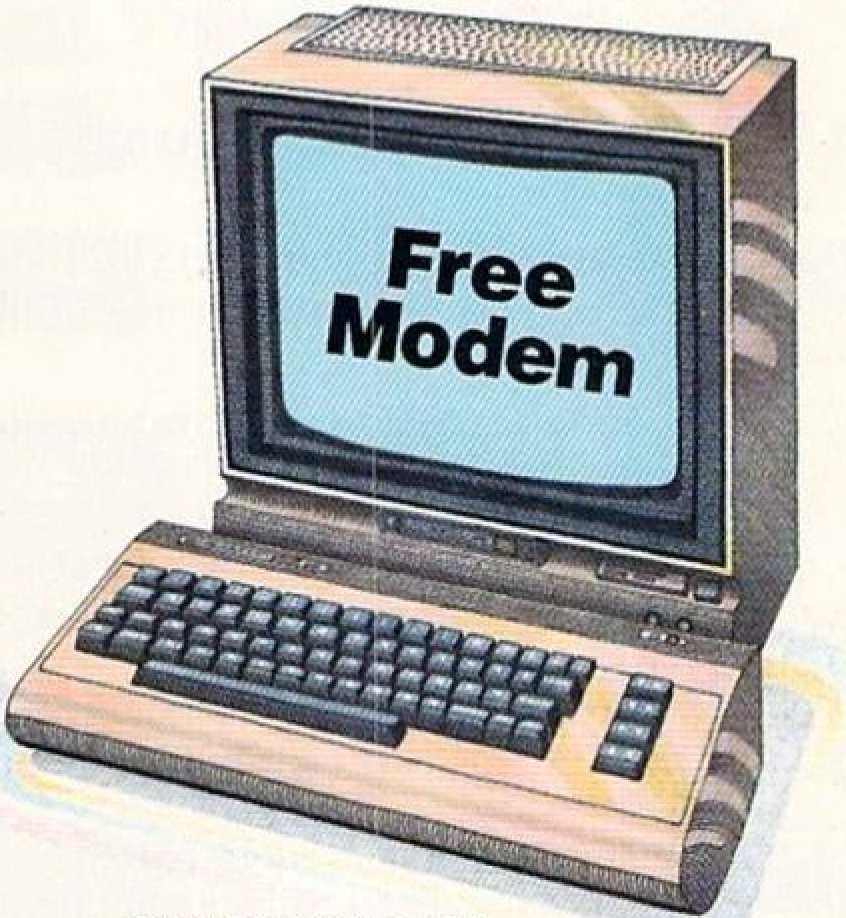

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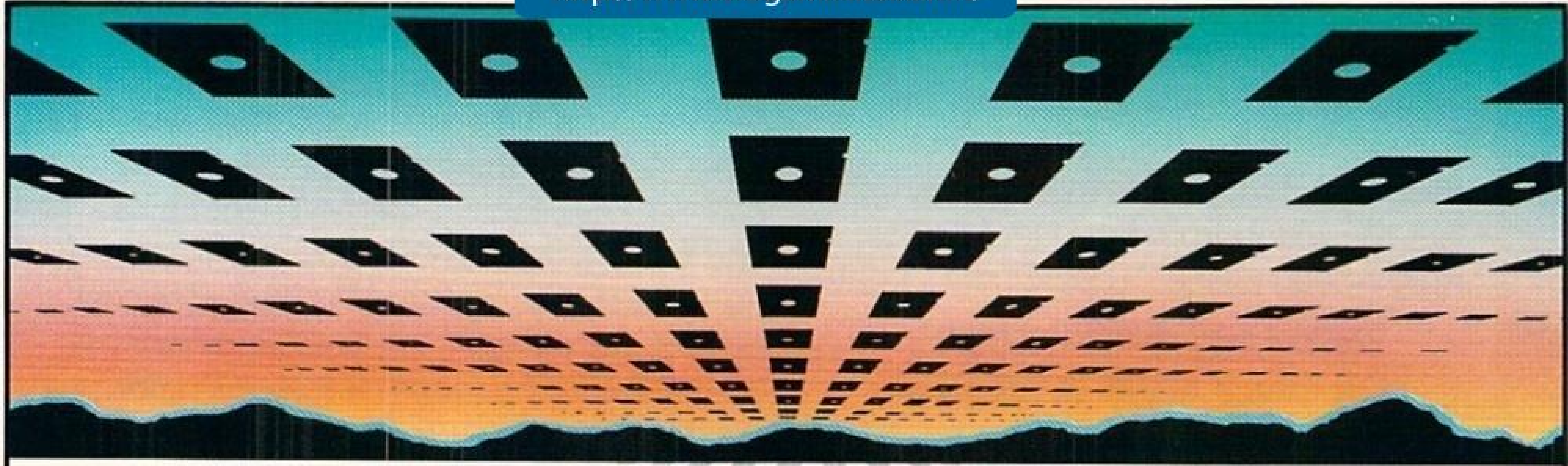

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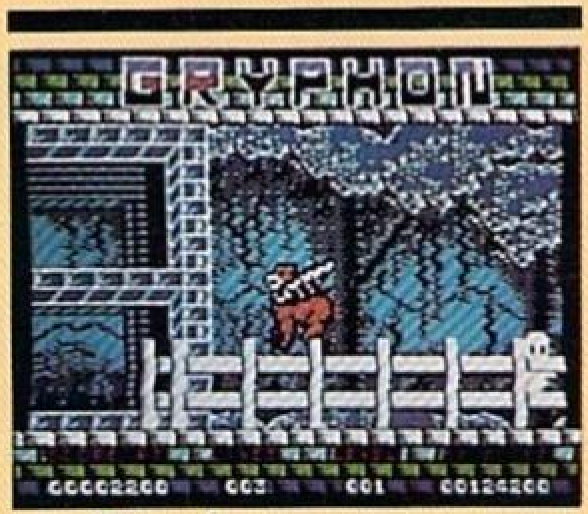
REVIEWED BY ERVIN BOBO

Gryphon

Computer: Commodore 64
Publisher: Avalon Hill
Microcomputer Games
4517 Harford Road
Baltimore, MD 21214
Medium: Disk
Price: $19.95



In Gryphon *your protagonist is often beset by impossible odds where no amount of arcade skills can help you.*

Though the Gryphon, with the head and wings of an eagle and the body of a lion, was one of my favorite beasts from Greek mythology, I always wondered what they do. *Gryphon* from Avalon Hill does nothing to answer this question, but does manage to capture the beauty of the Gryphon.

In the game, the Gryphon is the protagonist, his moves controlled by your joystick. At the beginning, he is in the Mystical Woods, a place of eerie beauty, filled with crystal trees and Greek columns. Turn your Gryphon to the left and, magically, a gold bar appears, held in his beak. But ghosts, looking remarkably like Casper, are out to get him, and at the slightest touch he can die. But you can always get to the ghosts first. The Gryphon seems to have a laser built into his head, or perhaps it is his fearful gaze that dissolves ghosts. At any rate, there are many ghosts to destroy, entering the screen from all directions.

You may turn left or right, firing your bolts, gaining points for each ghost destroyed, or you may take to the air. So long as you are flying either left or right, things are okay, but face the screen and you begin to fall.

At the end of level one is a stone wall that cannot be surmounted. It is posible to go under it, provided you can avoid the poisonous stream. This is where the gold bar comes in. Drop it in the stream, then fight your way back through the ghosts to pick up another one. Eventually, you will have built a bridge that can lead you into level two, the Surreal Cities and, eventually, to the Deadly Darklands.

While you are playing, an extremely smooth-scrolling action unveils the landscape and reveals new enemies and obstacles. It is here that the gaming becomes difficult. The scrolling often hides a ghost until it is too close for combat. But at the same time, the scrolling action is one of the game's greatest strengths.

Your Gryphon goes under, over, behind and in front of objects in the landscape, flying behind Ionic columns and behind bushes and trees weaving in and out of the landscape. Though the game play is an amalgam of *Defender* and *Satan's Hollow*, the execution, from the opening titles to the Darklands, is a visual feast.

Add to this an enjoyable musical score (though it seems more suited to a carousel than to a battle in the Mystical Woods) and good sound effects. *Gryphon* also incorporates a "boredom routine," something I've not seen before. Access it accidentally by plugging your joystick into port one, or deliberately by depressing B and N simultaneously. The result is the appearance of what seems to be a television test pattern intermittently interrupted by colorful bursts of interference. As "video wallpaper," it's not bad.

Gryphon is a good game, so long as you don't mind the fact that your protagonist is often beset by impossible odds—situations where no amount of arcade skills can help you. Fortunately, those situations to not occur at every turn, and it is possible, though difficult, to master the game. C

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REVIEWED BY GARY FIELDS

Data Manager 128

Computer: Commodore 128
Publisher: Timeworks
444 Lake Cook Road
Deerfield, IL 60015
Medium: Disk
Price: $69.95

Data Manager 128 stores, retrieves, compares, changes and evaluates data. This product for the Commodore 128 makes managing and deciphering information a breeze. The title identifies its power—it's not just a data *base,* but a data *manager.* This means it can do far more than just store and retrieve information.

Data Manager 128 allows you to design your own customized data bases, using easy-to-understand pull-down menus. Too often data bases are unyielding to change, but not this one. A base file created with *Data Manager 128* can be modified to encompass your changing needs. Fields can be added or deleted even after data has been entered.

But the power and usefulness of *Data Manager 128* is how it manipulates the data it stores. The ability to recall, examine, change and dump information to a printer is to be expected, but *Data Manager 128* goes far beyond that. By selecting specific search patterns, you can filter through information quickly and recall only useful details. For instance, if a business owner needed to find all the retail stores located in population areas under 200,000 west of the Mississippi River, that are managed by women between the ages of 35 and 40, which annually do $10,000 worth of business with his company, and have solid financial ratings, *Data Manager 128* can quickly locate and report that information. Or if you just want to do something simple like find out how long it had been since your six year-old had a tetanus shot, *Data Manager 128* will do that too.

The program will also locate and print specific information in report form suitable for business presentations. These reports can include as much or as little information from as many or as few files as you wish. The reports can be printed directly or saved in special files to be used by its sister programs, *Word Writer 128* (a word processor) and *SwiftCalc 128* (a spreadsheet), both by Timeworks.

Because files can be easily expanded or modified, the data base you create today can still be used years from now.

To grasp the relationship between statistics, many people find graphs more informative than raw numbers. Because *Data Manager 128* can calculate as well as store information, a special section of the program is designed to translate those calculations into graphs. In our example above, the business owner could have examined a graph of the different stores that matched his search and decided where to concentrate future business. Next, using the results of his search, the business owner could have used *Data Manager 128's* label-making abilities to prepare a mailing list.

Too often there seems to be a problem getting the correct blend of program sophistication and ease of use. Either the program is so complex the average user won't spend the time required to master it, or the program is so simple, it won't do the work it was bought to perform. But *Data Manager 128* comes close to finding the perfect blend. Its editing options make creating files and managing information relatively painless. Checks are activated to insure data is not changed or deleted accidentally, and the program's error-handling routines prevent the user from common input mistakes.

For instance, fields can be designed to store either alphanumeric, numeric, date, calculation or text data. So a field which is reserved for numbers will refuse input of letters, and date fields will accept only dates. Alphanumeric fields can be protected against duplication to prevent the creation of two records with the same account number or name. Users will also be happy that fields reserved for formulas cannot be overwritten by mistake.

Because files can be easily expanded or modified, the data base you create today can still be used years from now. With other data bases, adding a field to a file after it has been used can be a real headache, but with *Data Manager 128,* adding a field to the file can be done at any time and as often as you wish, as long as you don't exceed the limit of 100 fields. You can be sure this is a feature you will appreciate the first time you need it.

Finding data is as important as being able to store it. *Data Manager 128* has several features to make that task easy and fast. "X-SEARCH" allows you to cross-search data using different categories to locate similar items. "X-SORT" lets you arrange data in increasing or decreasing order so searches can be faster and spot searches pinpoint accurate.

Continued on pg. 122

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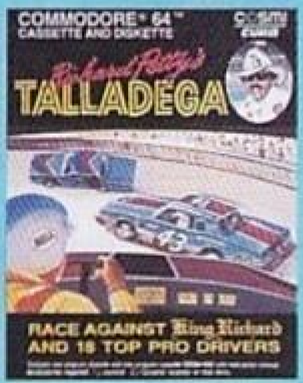
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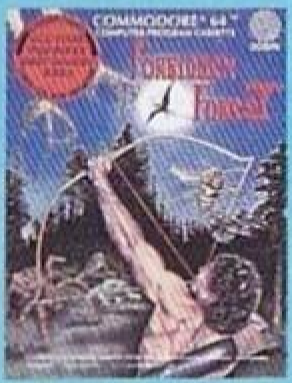
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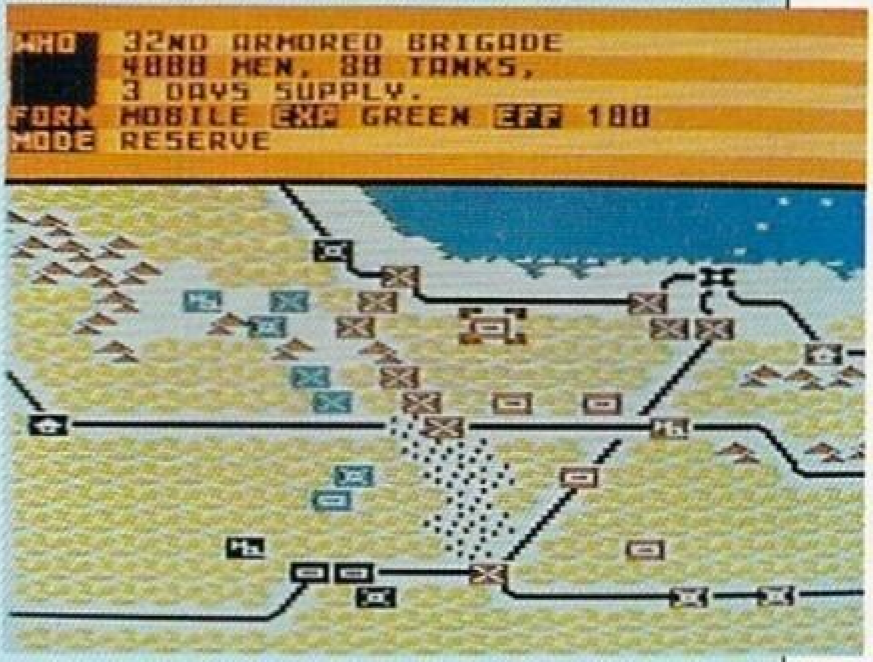
REVIEWED BY GARY FIELDS

Decision in the Desert

Computer: Commodore 64
Publisher: MicroProse
120 Lakefront Drive
Hunt Valley, MD 21030
Medium: Disk
Price: $39.95

You can switch sides in mid-battle as often as you want without ever being tried for treason.



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Decision in the Desert is a true simulation. As a commanding general in North Africa during World War II, you decide which troops will attack and which will hold. You decide when to retreat and when to press on. You decide who will live and who will die. And when the battles are over, you'll be glad that *Decision in the Desert* is only a simulation.

You choose from five battle scenarios, all of which can be customized. This means that you never have to fight exactly the same battle twice. And because you can command either side, you can fight a battle as the British one day, and on another day fight the same battle as the Germans.

Because *Decision in the Desert* is a historic simulation of World War II, the odds are not necessarily weighted in the computer's favor. Instead, the power of each army is determined by the conditions of a specific location in North Africa between December 1940 and September 1942. Strength of the opposing armies, generals, reinforcement schedules, and air support are all accurate.

But war is more than men and machines—weather conditions and terrain must be taken into account as well. Cloudy weather may ground your air corps. Rain (and it does rain in North Africa) will turn the desert into a sea of mud which will slow troop movement.

The game begins with General Montgomery addressing his troops while a military band blasts patriotic tunes in the background. You enter a password code, then pick one of the five campaign scenarios: Sidi Barrani, Operation Crusader, Gazala, First Battle of Alamein and Battle of Alam Halfa.

Now you pick a variant for the campaign and which side you will command. *Decision in the Desert* allows you to switch sides in mid-battle, and you can switch as often as you want without ever being tried for treason! Battles can be fought in under an hour, or can span several hours. A save-and-replay option is included so you don't have to play all at one sitting.

Although the game can be controlled by either a joystick or a keyboard, I found the keyboard the quickest way to issue commands. By first positioning the cursor over a unit, you can quickly check its battle readiness, supply status and morale, and issue commands like attack, defend, move and reserve. Pressing the "G" key displays information about that unit's commanding general. The "T" key clears the screen so you can inspect the terrain.

The game's different battle screens realistically display the terrain of North Africa. Roads, cities, minefields and airstrips are all easy to identify. Newcomers to war games will appreciate the choice of displaying military units as icons (men look like men, tanks look like tanks), while seasoned war gamers will probably prefer to display the battling pieces using their military symbols. Because each battle map can be several screens in size, you'll need to constantly scroll to keep in touch with all your troops. This also means, of course, that just as in real battles, you can lose track of units.

The action here is non-stop. Troop movement is continuous and only stops if you press "F" for "freeze." Freeze allows you a chance to answer the phone or, more likely, catch your breath and plan your next move. To win, you must carefully plan attacks on defendable terrain. Armored troops fight better in open terrain, while infantry do better in towns or broken terrain to provide some protection from enemy fire.

I can fault the game with but one omission: Messages from units in battle often come so fast that the second message replaces the first before it can be read. I would like to be able to recall the last two or three messages.

The copy-protected disk comes with a well written, 56-page manual which includes helpful historical notes about the real battles *Decision in the Desert* simulates, as well as maps. *Decision in the Desert* is the second simulation of MicroProse's Command Series, and establishes a new standard of excellence for war simulations. Like its sister program *Crusade in Europe* (see review in October/November, 1985, *Commodore Power/Play*), *Decision in the Desert's* action, graphics, realism and playability are all top quality. The game plays like war—a single mistake or missed opportunity can easily shift the tide of battle. And although the game is very complex, its controls are logical and easy to master. Both experienced and novice players will be delighted with this offering from MicroProse. If there must be wars, this is the way they should be fought. ◼

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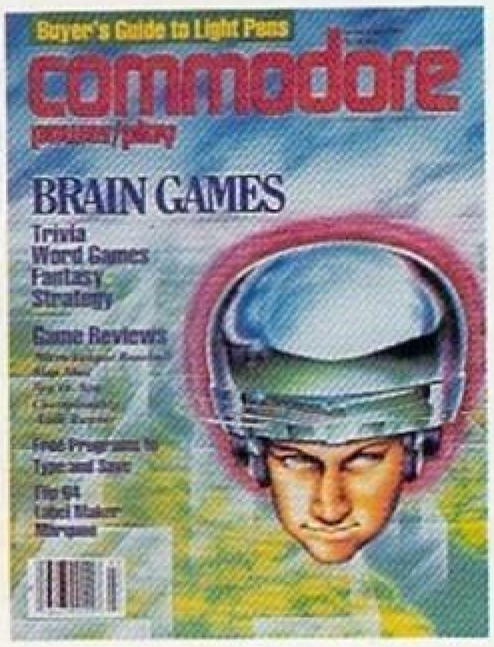
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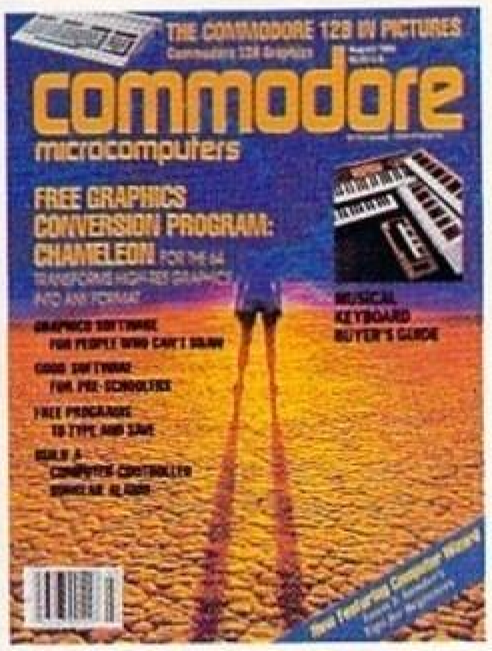
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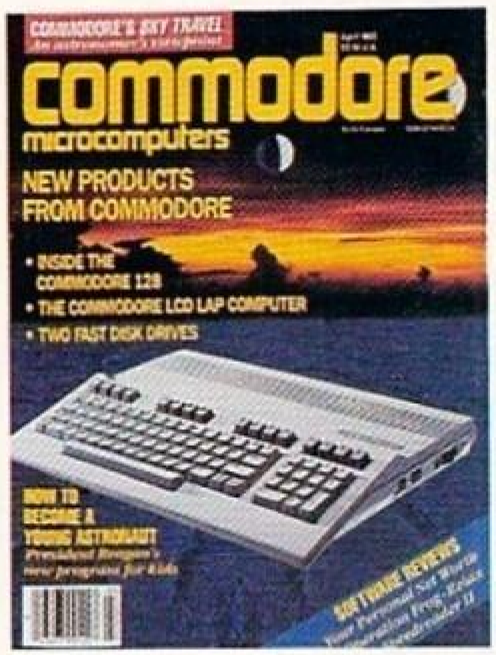
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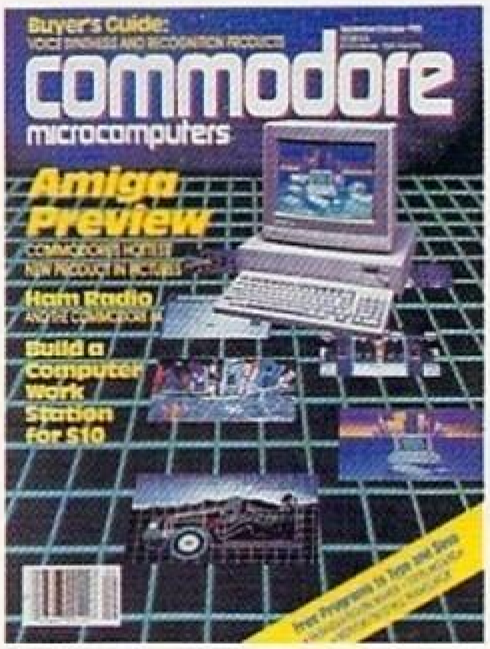
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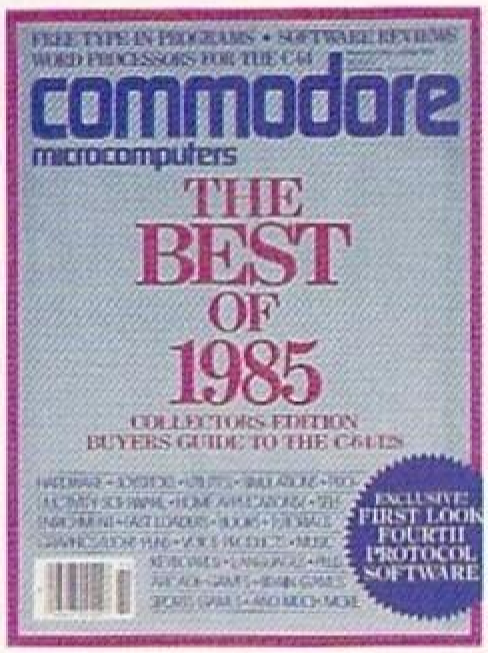
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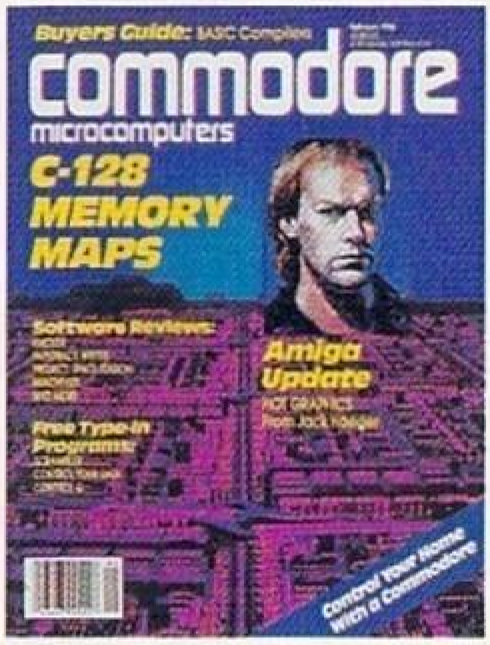
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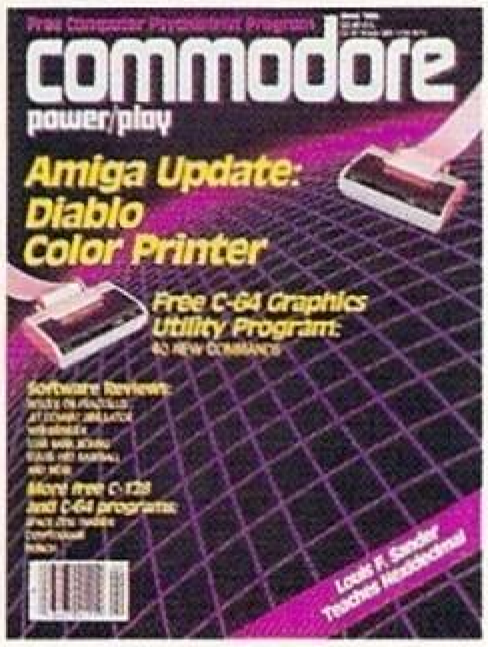
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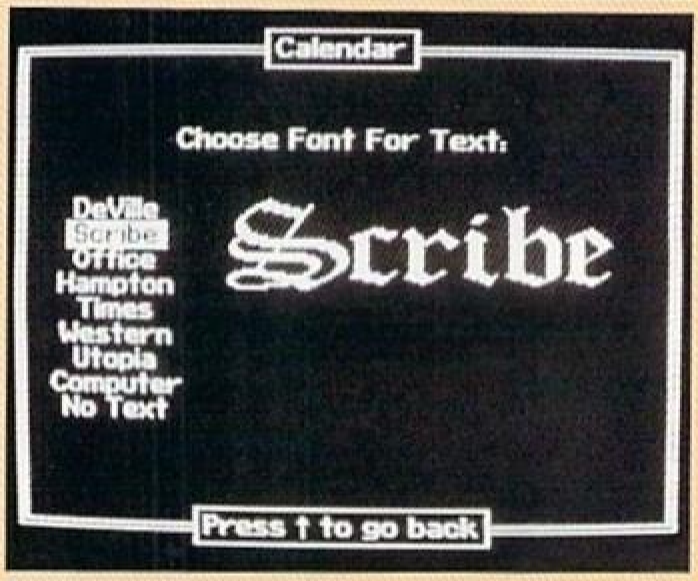
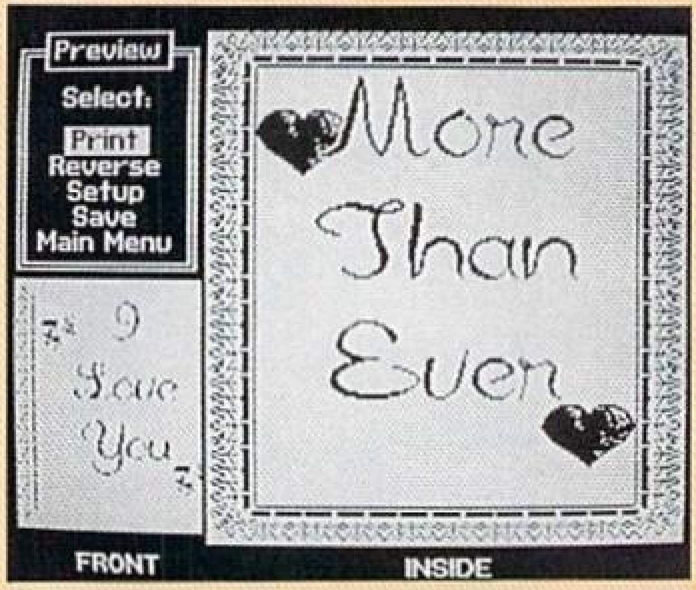
REVIEWED BY ERVIN BOBO

PrintMaster

Computer: Commodore 64
Publisher: Unison World
2150 Shattuck Avenue
Berkeley, CA 94704
Medium: Disk
Price: $34.95

PrintMaster *lets you create greeting cards, signs, banners, T-shirts, calendars, or stationery, and offers all the features you would expect from computers with greater memory.*





When I heard about a new printing program for the Commodore 64 that was rumored to be better than anything else on the market, I couldn't wait to get my hands on it. But when it arrived and turned out to be *PrintMaster,* I was almost disappointed.

For some time, I had been using *PrintMaster* on the IBM PC and had grown quite fond of it. But I was fully aware that more memory allowed for more features than were possible on a 64K machine, and I expected the 64 version to be abbreviated.

The good news is that I was wrong. Making use of disk access routines, *PrintMaster* offers all the features I'd come to rely on—including the Preview feature, which sets this program apart from all others of its kind.

You begin with a menu to make greeting cards, signs, calendars, or stationary. Also on the menu is the Setup routine. It is imperative that you go through this before doing anything else. If you simply jump in and create a banner or sign, you may find that you are unable to print it.

Listed on the outside of the carton are more than a dozen printers supported by *PrintMaster* and the two interfaces: Cardco and Turbo-Print/GT. There is some leeway allowed. Neither my printer or interface are on the list, yet they work fine. Investigate this before you purchase the program.

After the Setup routine and the printer test, return to the main menu and select your project. As with other programs of this kind, the choice you make leads to another screen with more choices. It will be here that you begin to see the superior features of this program. Besides containing 111 graphics pictures, 11 borders and 11 graphics patterns, *PrintMaster* shows you what each picture will look like before you select it. Pressing the Commodore key at the prompt causes a quick disk access that loads the library into RAM so that you can flip through your choices quickly and easily. (The *PrintMaster Art Gallery I,* available separately for $29.95, offers over 600 more graphics.)

From there, you choose one of eight fonts, each displayed for you and available in two sizes to compose your message. *PrintMaster* allows you to mix sizes and fonts on a single page for even more variety. As you type, you can choose whether to justify or center each individual line, the size of type for each line, and the font for each line.

Now you're ready for the most exciting feature of the program: the Preview. *PrintMaster* provides a full view of your creation so that you can see exactly what you've done before you print it. In the case of greeting cards that have two separate pages, you are first presented with a full view of the outside. Next, the outside shrinks to about one-third the original size and the inside is displayed, allowing you to see your card in its entirety. If anything is not to your liking or if you think you might do better, you can now go back to any point in the program, in reverse order, and change whatever you want.

Should you feel none of the graphics in the library are appropriate, *PrintMaster* gives you the option of creating your own designs or modifying existing designs through the Graphic Editor. Functioning much like a sprite editor, this option lets you use joystick or cursor keys to move around the grid, drawing and erasing one pixel at a time until you have just the effect you want.

The black-and-white display is crisp and sharp at all times, the on-screen representations of graphics and fonts are exactly as they will be printed, and the Preview mode introduces a feature which should be a must in printing programs. If there is a drawback to *PrintMaster,* it is only that not every printer and only two interfaces are officially supported. But you can't have everything. C

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REVIEWED BY SHAY ADDAMS

Heart of Africa

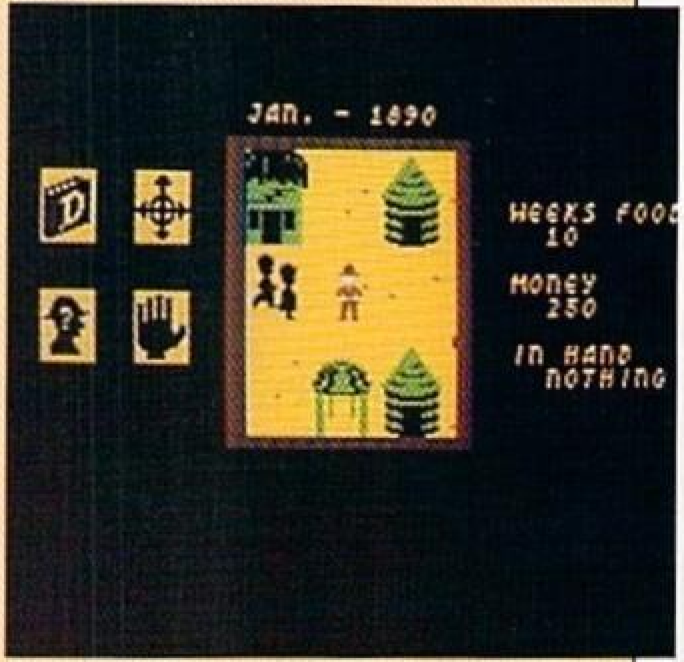
Computer: Commodore 64
Publisher: Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
Medium: Disk
Price: $34.95

Despite the numerous awards won by *Seven Cities of Gold,* I sailed the disk out a window after three days—so I was surprised to find myself having so much fun with this sequel. A one-player expedition into 19th-century Africa, it surpasses *Seven Cities of Gold* in many ways: The graphics are sharper, the animation is more detailed, and you don't have to waste time copying a scenario disk before playing the game. But the most significant difference is that *Heart of Africa* makes it simpler and less confusing to interact with the people you meet out in the boondocks of a newly discovered continent.

In *Seven Cities,* no matter how friendly I acted toward an Indian chief (on the few occasions I managed to distinguish him from the rest of the tribe), the encounter inevitably ended in a misunderstanding that sparked a battle. I killed a lot of them, they killed me, then I started the game over. Here I had no trouble communicating with the Africans because the process is more straightforward: You simply bump into one. The results of the meeting depend on what, if anything, you're holding in your hand.

It follows the same theme as *Seven Cities of Gold:* the step-by-step exploration of an uncharted land. The goal here, though, is more fanciful, for you seek the tomb of a fictitious Egyptian Pharoah, Ahnk Ahnk, who had his treasures buried with him in a secret location to thwart would-be grave-looters. In addition to grabbing the treasures, you'll be able to claim the valuable estate of the recently deceased Hiram Primm. Primm spent his life—and lost it—searching for the tomb. Now a letter from his lawyers, included in the manual, explains that you've been appointed heir apparent, but must find the tomb in order to collect.

An ever-intriguing continent of danger and discovery awaits the intrepid adventurist in the search for the Egyptian Pharoah's secret tomb in this sequel to Seven Cities of Gold.



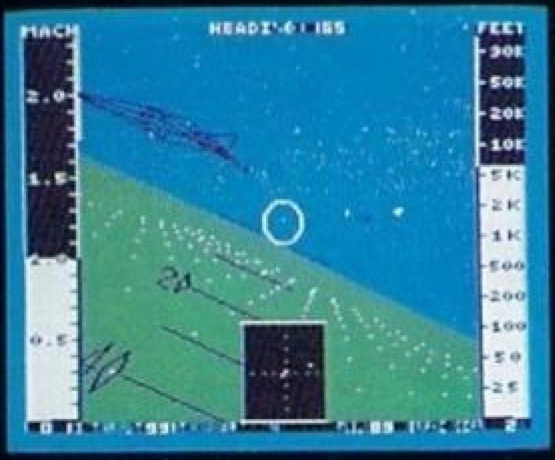
The law firm advances you $250 for expenses and drops you off near Cairo, where the game commences in 1890. Your character, an animated stick-figure on the main map, is portrayed as an intricately animated man wearing a pith helmet when he enters a town. Head due south for the first town, Cairo, and the aerial view of the continent is replaced by a similar perspective revealing the buildings, huts and the animated inhabitants strolling around town. Here you should immediately stock up on supplies before heading west into the Sahara or south along the Nile River. Equipment includes medicine, pistols, a ship (for the Indiana Jones fans in the crowd), shovels, canteens, and gifts for trading to the natives.

A center-screen window depicts your immediate surroundings, with your money, food supplies, and number of gifts itemized on the right. Four icons are on the left. By mashing the button (the entire game is joystick-controlled), you can highlight and activate an icon to obtain more information or conduct other activities. Select the hand icon, for example, and a fresh window provides more choices: You can pick up an object or take a tool from your backpack and hold it in your hand. Inventory is limited, but you may stash items anywhere on the surface map and return for them later; an "X" automatically marks the spot. Similar options streamline the process of shopping for supplies. A single line of text at the bottom of the screen describes any discoveries.

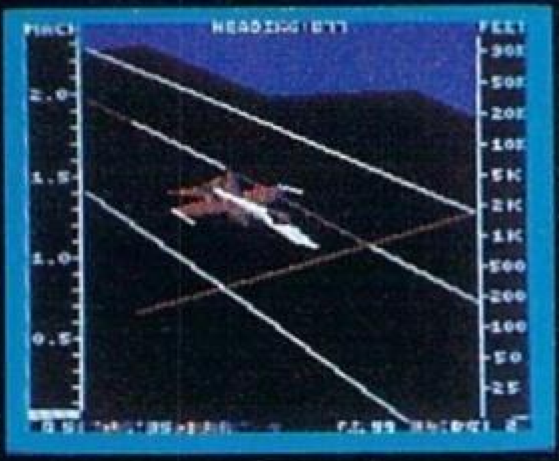
Most games simply announce the news when a character becomes sick or hungry, but *Heart of Africa* illustrates the effects of these conditions with lively animation. If bitten by an enraged hippo while swimming across a river, your character limps along slower than normal. If tramping through a swamp, jungle, or other rough terrain, he will be bogged down unless armed with a machete. This fate also befalls the poorly prepared bwana who depletes his food supply. And if he runs out of water in the desert, he gets delirious and responds erratically to the joystick by moving left when you tell him to go right, or even walking or swimming around in circles. By choosing the appropriate option, you'll get an update on your character's health and general location.

Gifts are instrumental in finding the tomb, for clues to its location are revealed in the legends of the Hausa, Mongo and assorted tribes. Only after you've won their confidence with the proper gift will the natives help. Some will offer advice, others will fork over a bearings map that shows the location of otherwise hard-to-find sites. Each tribe prizes certain items and considers others taboo, so be sure to study the clue-filled manual thoroughly before embarking. Present a Masai with a copper bracelet, for example, and you'll soon wish you had

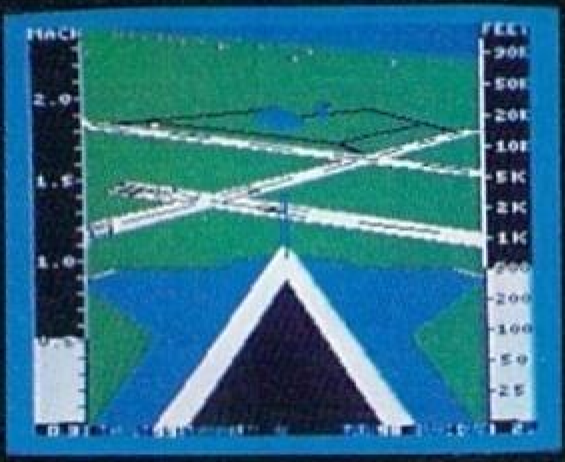
Continued on pg. 124



F-16 Dogfight with Enemy MiG-23 Fighters



F-18 on the Deck of a Nimitz-Class Aircraft Carrier (Control Tower View)



F-16 High-G Pullout over Detailed Wargame Scenery (Rear View)

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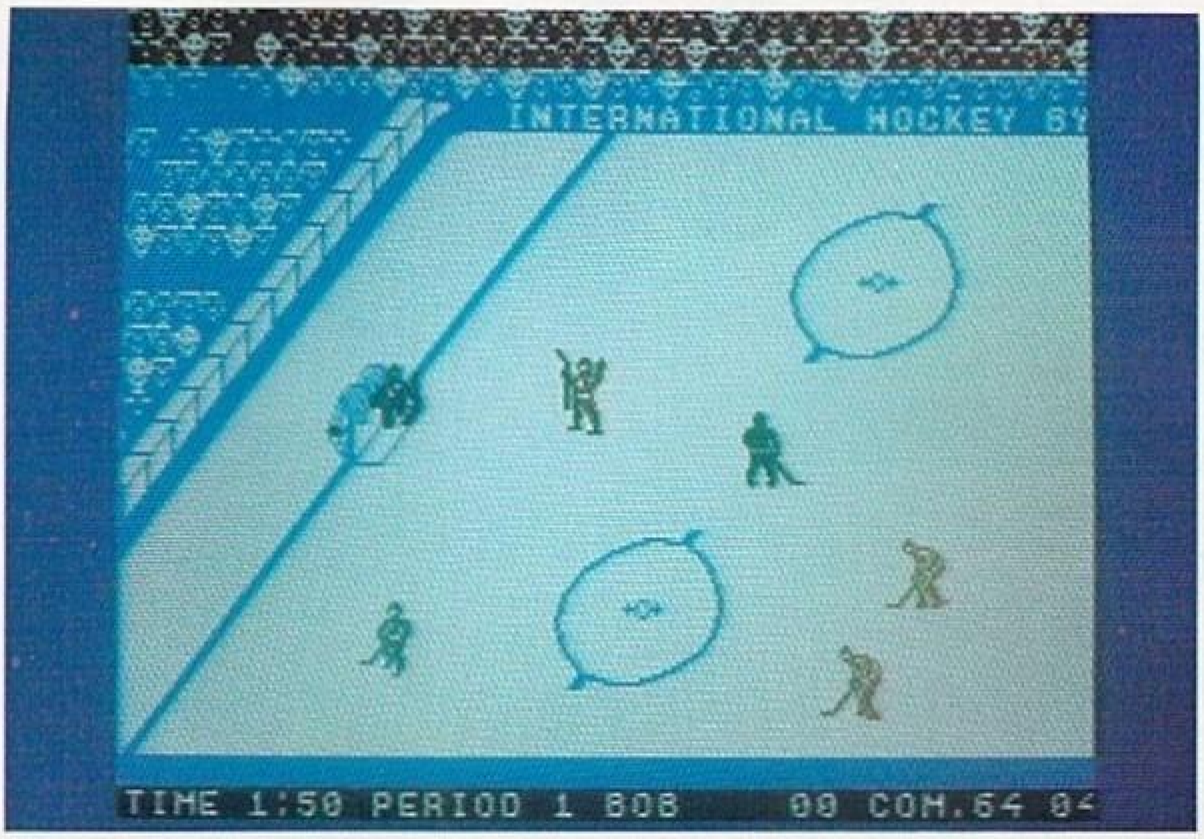
REVIEWED BY MARK COTONE

International Hockey

Computer: Commodore 64
Publisher: Artworx
150 North Main Street
Fairport, NY 14450
Medium: Disk
Price: $24.95



At times, ice hockey can be poetry in motion: padded players dazzle audiences with synchronized skating and artistic acrobatics. And just as often, hockey can possess all the grace of a street rumble as bodies slam, sticks slash, hands clutch and punches fly. It is this blend that was successfully captured and brought to Commodore screens last year in Artworx's *Slap Shot.* With its release, designer Ken Grant delivered a contest that captured all the skilled thrills and brutal spills of the real thing. Who could ask for more?

Mr. Grant, that's who. For, like a fussy team owner, he went back to improve a squad already heralded as the best. The result is *International Hockey.*

With a zealous organist spurring on the restless crowd, *International Hockey* begins with two teams waiting for the center ice face-off. The rink is viewed from a "press-box" perspective, presenting a vantage very similar to the one provided by television's long-range camera. When the puck is dropped and the players scurry for position, the screen will pan back and forth to follow the action.

The contest's pace is relentless. Offensive wingers cut in on goal, stick handling, passing and shooting for any opening that can be found. Defensemen do what they must to thwart the attack. Checks are leveled, the crease is cleared, and rebounds are quickly covered as the goalie slides low and springs high to stop a flurry of shots.

And while the realistic play is quite impressive in and of itself, what's even more remarkable is that all of this on-screen movement is accomplished with a few uncomplicated taps and tugs on the joystick. Only a minute or two of practice is needed to put all your ice hockey coaching theories to the test.

International Hockey even incorporates a sticks-down gloves-off toe-to-toe slugfest.

Some purists might be initially distracted by a few omissions: There are no offsides or icing calls, no line shifts, and no power plays. But when placing the emphasis on continuity of motion and ease of use, the elimination of some elements can be justified. And even with the compromise of some rules and regulations, this program still successfully captures the sport's true sights and sounds. When a blast beats the masked goalkeeper, the twine pulls, the crowd explodes, and the scorer thrusts his arms high in victory. Lay a body check into an onrushing attacker and he'll fall to the ice in a daze while the puck squirts free. And if you hound a player long enough, he may instigate one of those infamous hockey brawls.

That's right. This game even incorporates a sticks-down gloves-off toe-to-toe slugfest. And not only will the onlookers be treated to the slightly humorous sight of the two video headhunters pounding each other, but each team will also be awarded a rarely called penalty shot, a one-on-one showdown between shooter and goalie. The game screen changes to display a perspective from the attacker's point of view. Both players then take their turn in each position, trying to out-finesse and out-guess the opponent in a brilliantly animated duel.

But these authentic visuals are only half the story. The audio portion of *International Hockey* has been orchestrated to make you feel as if you're playing right in the middle of a packed arena. Not only will the rhythmic organ bursts and buzzing crowds keep you motivated, but a sporadic use of voice synthesis has been incorporated to highlight the game's more dramatic moments. The crisp, clear cries of an enthusiastic fan accentuate the action, as he leads cheers ("Charge!"), spots infractions ("Penalty . . . tripping."), punctuates altercations ("Fight! Fight!") and rejoices over each goal ("He scores!!"). Even if you're the only one in the room, you'll never feel alone.

The game is divided into three two-minute periods and can be played against a human opponent or the computer at three difficulty levels. I've yet to out-skate the Expert squad, stiff competition even after you've mastered the rights of the rink. Beat these guys with any consistency and you're ready for the Stanley Cup.

Continued on pg. 126

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REVIEWED BY GARY FIELDS

Body Man I

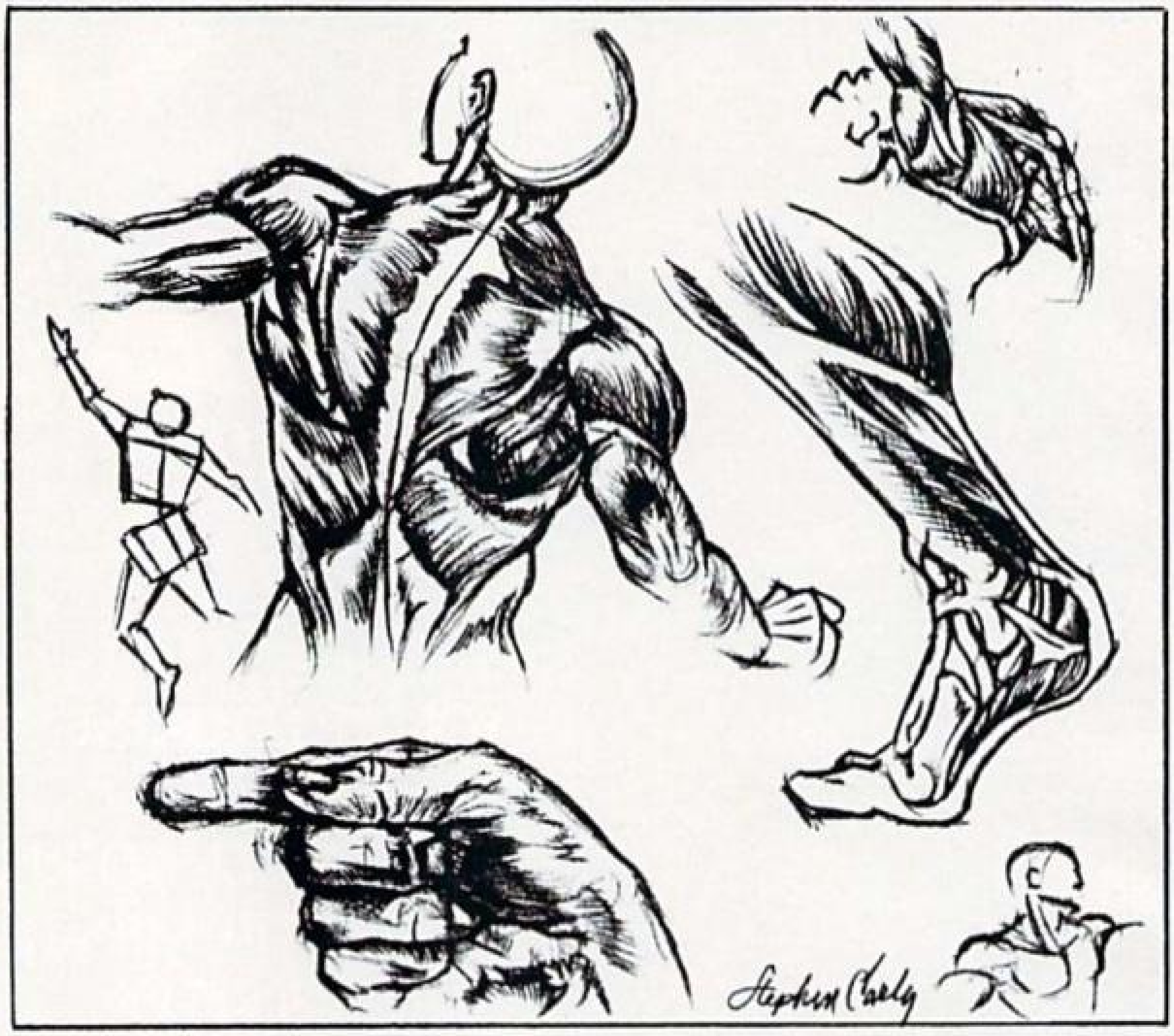
Computer: Commodore 64
Publisher: Nanosec
4185 South 300 West
Ogden, UT 84403
Medium: Disk
Price: $39.95

If evidence is still needed to prove that a computer, coupled with the right software, is a better teaching tool than a textbook, this program provides it. Kenneth Hard's *Body Man I* brings to the classroom a program that both teaches and tests students in human anatomy. The program graphically explores man's body: from the surface of the skin to the spleen, and all organs in between.

Body Man I's main menu offers options to study one of three sections of the human body (head, upper torso or lower torso), take a final exam, or watch a demonstration. Each display is a pixel-perfect, textbook quality facsimile: A liver looks like a liver, a stomach looks like a stomach, and the brain looks like a brain.

As you move the on-screen pointer over an organ, its name will appear. To select an organ to study, just press the joystick's firebutton or the spacebar. Now a detailed, colored illustration of the organ appears, including cross sections. Text describing the body part, its make up, function, size and information of interest are printed in the area below the graphic. As information is displayed, an arrow will point to the specific section of the organ being described. After the student has absorbed the information, the arrow will move to another section of the organ and new information will appear.

After a lesson on the body part is finished, the student can either review the material, take a quiz, or return to the main menu. When quiz is selected, the screen displays a classroom, complete with a teacher. Multiple-choice questions are asked and graded. After the test, the displayed results can be dumped to a printer. The printout includes the student's name, the date, percentage grade and a repeat of all the questions the student incorrectly answered.



Body Man I *graphically explores man's body: from the surface of the skin to the spleen, and all organs in between.*

Body Man I brings to the classroom a never-tiring and always-patient teacher. With it, each anatomy student can study at their own speed. Less motivated students may find in this teaching tool the catalyst they need to spark their imagination.

Four program disks are required to store all the lessons and illustrations. This does mean that the student must switch disks often, but to make locating the correct disk easier, each is color coded and numbered. Because the material covered by *Body Man I* is for junior high school students and older, safe handling of the disks should be no problem.

I found the program very easy to use and forgiving of errors. For instance, failing to turn the printer on at the correct prompt or failing to insert the correct disk at the proper time did not result in lost data or a system crash. Instead, the screen acknowledged the error and prompted the proper action to take.

However, getting the program loaded and running is not that easy. Nanosec has made the program disk both copy and password-protected. The password is supplied only after Nanosec receives the registration card packed with *Body Man I.* The wait for the postal service to deliver the registration card to Nanosec and their reply can take several weeks, but to soften the wait slightly, the program allows 20 loads before it demands the password.

Other than the inconvenience of the password protection and a few minor typo errors which pop up in the program's text displays, I found *Body Man I* a notable educational tool. While *Body Man I* can teach in any home, it really belongs in the classroom where the most children can benefit from it. If you are a science teacher with Commodore 64's in your classroom, this is a teaching aid you should try.

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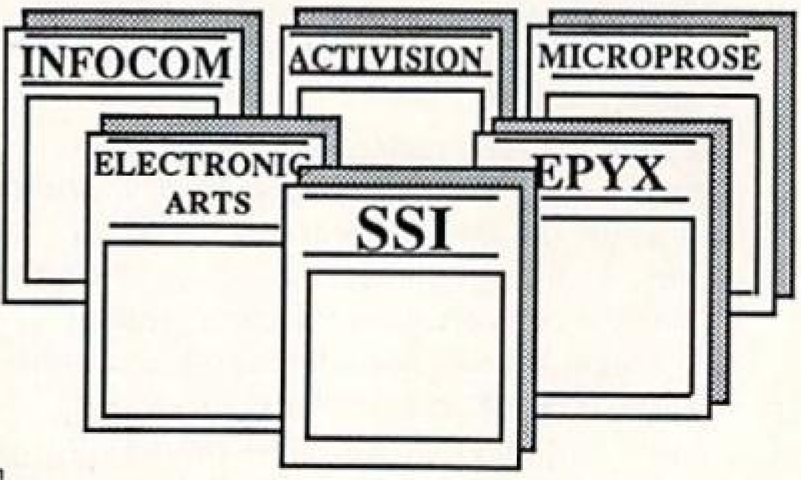

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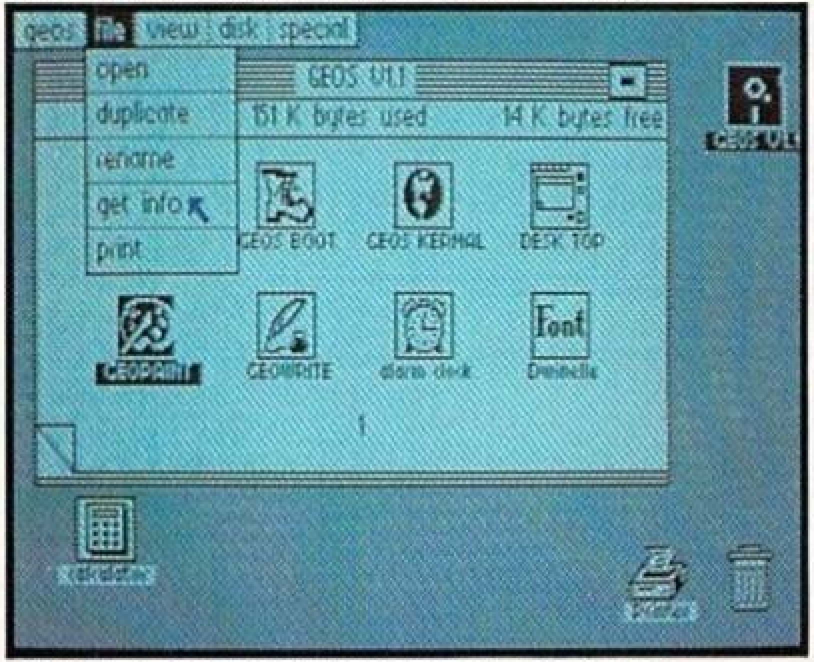
deskTop. deskTop is a graphic interface, making file organization and management easy. As always, you call the shots. Load a disk. Files appear as icons on the disk notepad; to flip through, point at the folded corner and click. Prefer a file appear on a different sheet? Move it. It's easy.



Create a new document or re-name an existing one. Want to copy a file onto the same or a different disk? Fine. Forgotten what a file contains? Select "get info" from the file menu. A description of that file's contents appears. Finished with a file? Print it. Save it. Or drop it in the trash and have done with it. Your call.

geoPaint. A full-featured, color graphics workshop at your fingertips. The pointer operates any one of the fourteen graphic tools and shapes in the drawing menu. Create masterpieces on the Drawing Window. By turns, use a pencil, an airbrush or a paint brush, each with a character all its own. Draw straight lines, squares, rectangles or circles. Fill in with any of the 32 patterns. Switch to pixel-mode, where each dot in a selected section is magnified many times its size for easy manipulation.

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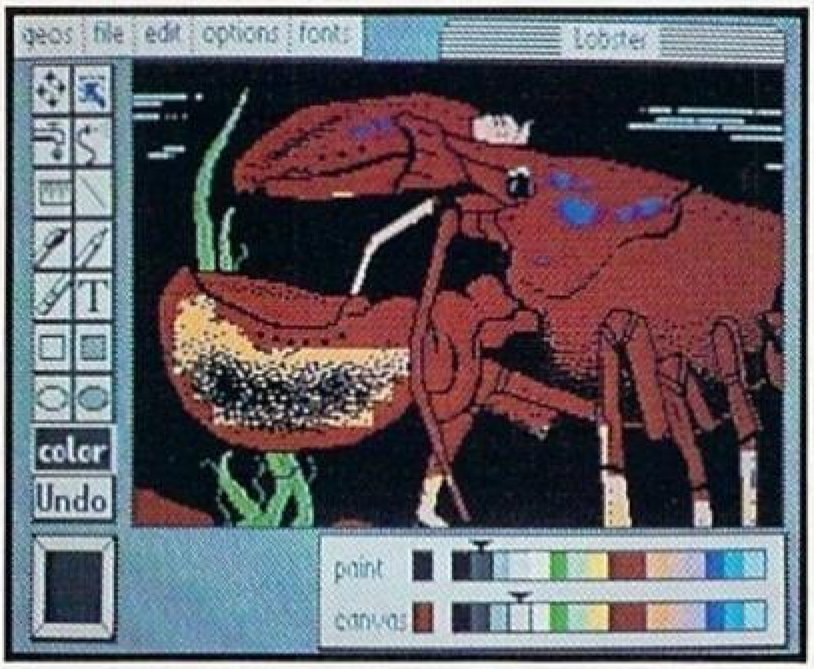
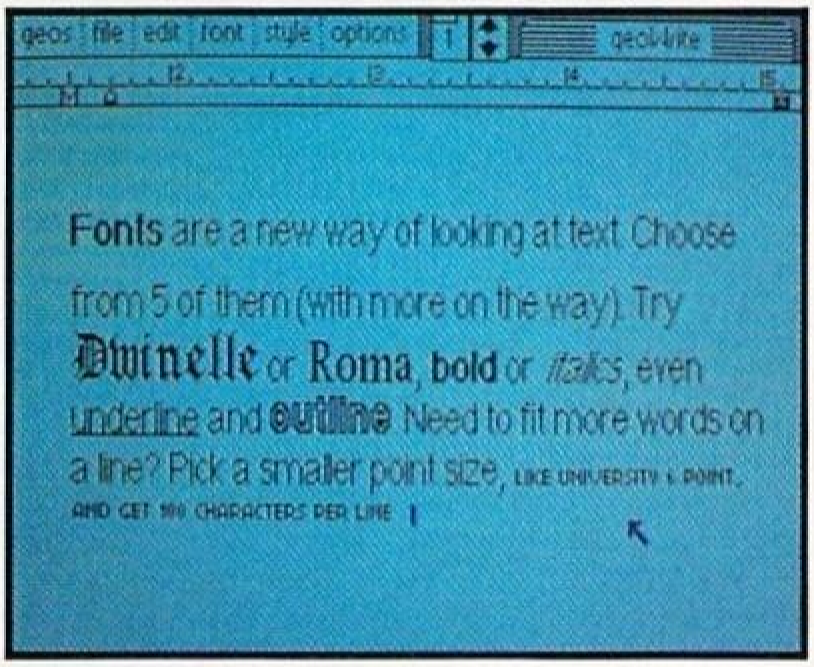


Second thoughts? Erase what you don't want. Or "UNDO" your last act. (If only life could imitate art!)

Add text if you like, in different fonts, styles or point sizes. Even change its position or layout at will.

Move or copy any part of your creation. Once done, you can include your artwork in another document—a letter home perhaps. (Won't Mother be pleased?) GEOS makes it easy.



Fonts are a new way of looking at text Choose from 5 of them (with more on the way). Try **Dwinelle** or Roma, **bold** or *italics*, even underline and **outline** Need to fit more words on a line? Pick a smaller point size, LIKE UNIVERSITY 6 POINT, AND GET 100 CHARACTERS PER LINE

geoWrite. An easy to use, "what you see is what you get" word processor. Create documents. Insert, copy, move or delete text as you wish. Choose from 5 different fonts in many different styles and point sizes. Preview your page exactly as it will appear off the printer. Typists will appreciate tabs, word-wrap and page breaks.

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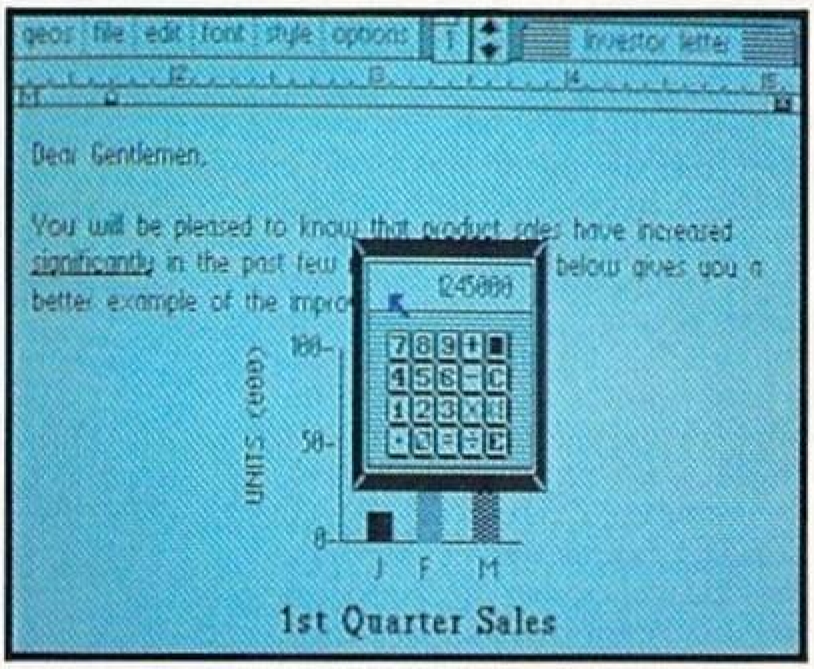

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REVIEWED BY ERVIN BOBO

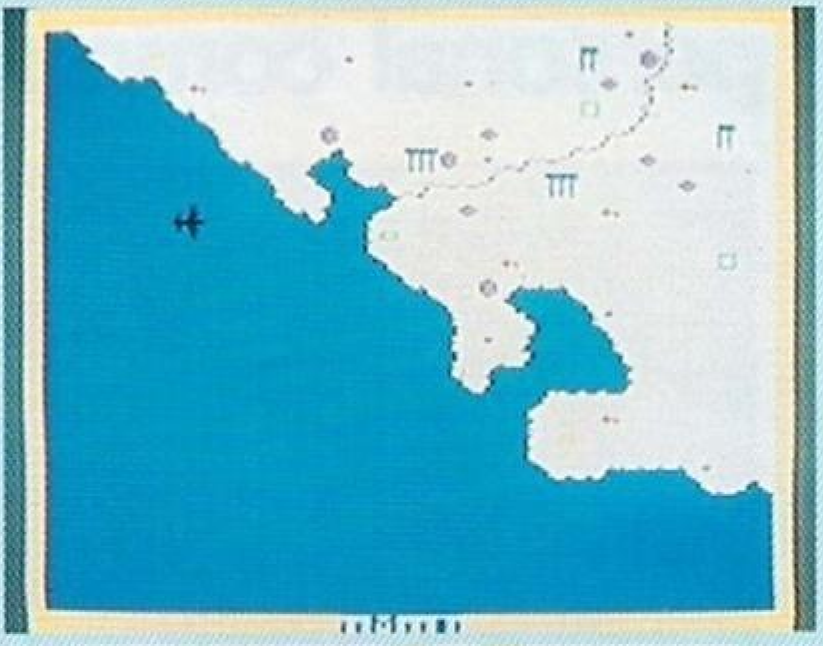
The Dam Busters

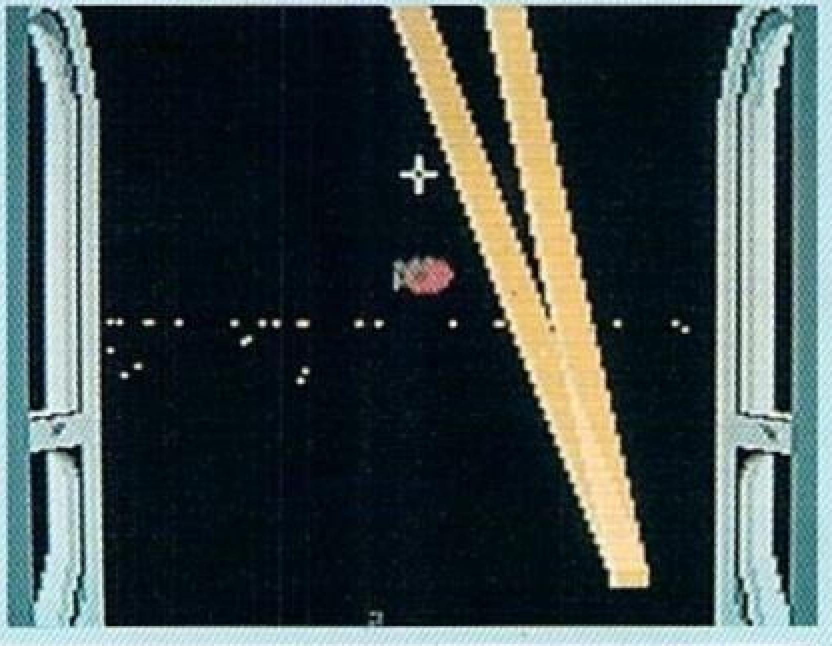
Computer: Commodore 64
Publisher: Accolade
20863 Stevens Creek
Boulevard
Cupertino, CA 95014
Medium: Disk
Price: $29.95

We've all seen the trend of turning successful movies into computer games. But the movie "The Dam Busters" is over 30 years old. The event upon which the movie was based is even older, having occurred on May 16, 1943. Who of the gaming generation has ever heard of it? In this case, it doesn't matter.

I remember the movie, if not the raid itself, and I was surprised at the accuracy of the game. The mission in the movie was to destroy three power dams in the Ruhr valley of Germany, to not only cripple that country's capacity for generating hydroelectric power, but flood the valley as well.

> *Your mission is to destroy three power dams in the Ruhr Valley of Germany, to not only cripple that country's capacity for generating hydro-electric power, but flood the valley as well.*





To accomplish this, a new method of bombing had to be developed. Assuming that a rain of conventional bombs did strike the relatively small target, they would damage only the top of the dam. But, like an iceberg, most of a dam is underwater, so if a bomb could be made to contact the dam underwater, then explode, hydrostatic pressure would add to the power of the bomb and destroy the dam.

In the first phase of *The Dam Busters,* you practice this technique. As the pilot, you must attain a speed of no more and no less than 232 mph as you approach the dam from upriver at an altitude of precisely 60 feet. As the bomb specialist, you are responsible for attaining the correct altitude. Then, as the bombardier, you watch the dam grow in your sights. At the moment when you are exactly 800 yards from the dam, release the bomb.

After a brief wait for disk access, you view the plane dropping the bomb. The bomb skips across the water to avoid torpedo nets (thus the need for all that precision) and, if everything is exactly right, the dam is destroyed. If not, you are told why. But unlike Wing Commander Guy Gibson and his crew, you may go back and try again.

In the second section of *The Dam Busters,* the opposition that doesn't exist in the practice run is present: searchlights, anti-aircraft fire, barrage balloons and ME-110 night fighters. You are the pilot keeping your craft flying; the navigator keeping the craft on course; the nose gunner and the tail gunner shooting at searchlights, barrage balloons and ME-110's; and the engineer extinguishing engine fires and keeping the airplane aloft. You switch from one position to another by the numeric keys: one for pilot; two for nose gunner; three for tail gunner, and so forth. At the bottom of the screen, a tiny window may flash, telling you of an area needing immediate attention.

Because of clever uses of RAM, switching from one position to another *is* immediate and, although there may be times when you won't believe it, it is possible to survive this run. However, should you not survive, a "score card" will inform you of the number of hazards faced, the number handled correctly, the reason for your demise, and your rank.

In the third and last segment, the entire mission comes together. Here, you take off from Scampton Field in England. During takeoff, the burden of work is upon the pilot and the flight engineer. Then, as navigator, you must consult the map and set a course for the Ruhr Valley. Once across the English Channel, you'll come under fire, and if you survive, you'll reach the valley where you must line the airplane up for the bombing run. You'll have your hands full.

Continued on pg. 120

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Stephen S. Leven, Sept./Oct. Commodore Microcomputers, page 32

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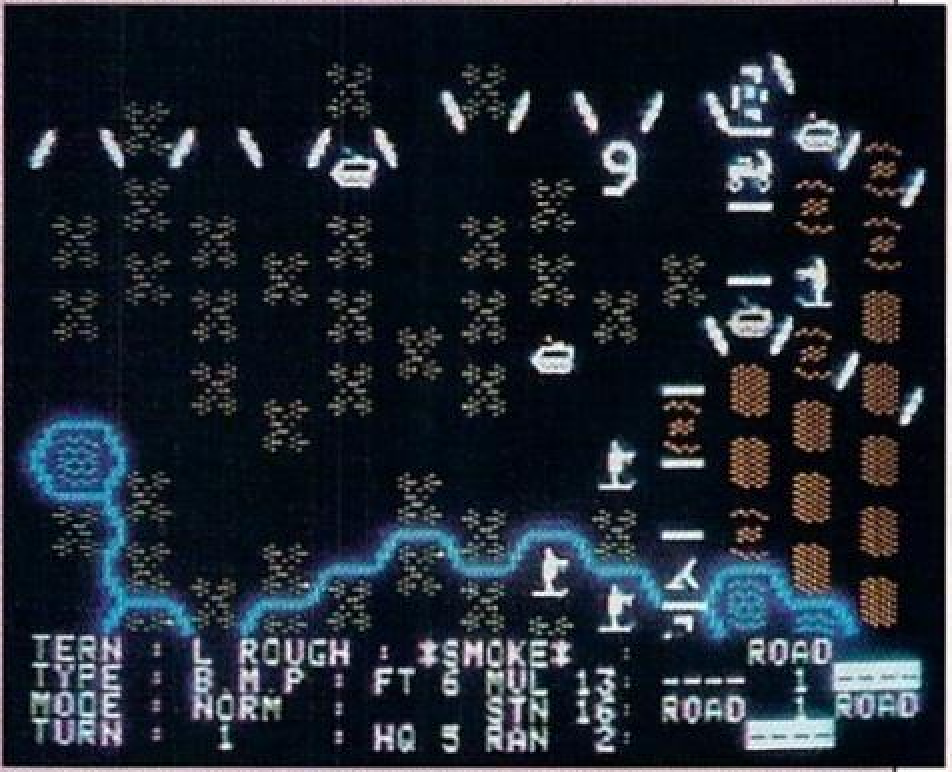
REVIEWED BY GARY FIELDS

Norway 1985

Computer: Commodore 64
Publisher: Strategic Simulations
1046 North Rengstorff
Avenue
Mountain View, CA
94043
Medium: Disk
Price: $34.95



```
TERN : L ROUGH : *SMOKE* :          ROAD
TYPE : B.M.P  : FT 6 MUL 13: ----   1
MODE : NORM   :      STN 16: ROAD   1 ROAD
TURN :   1    : HQ 5 RAN  2:
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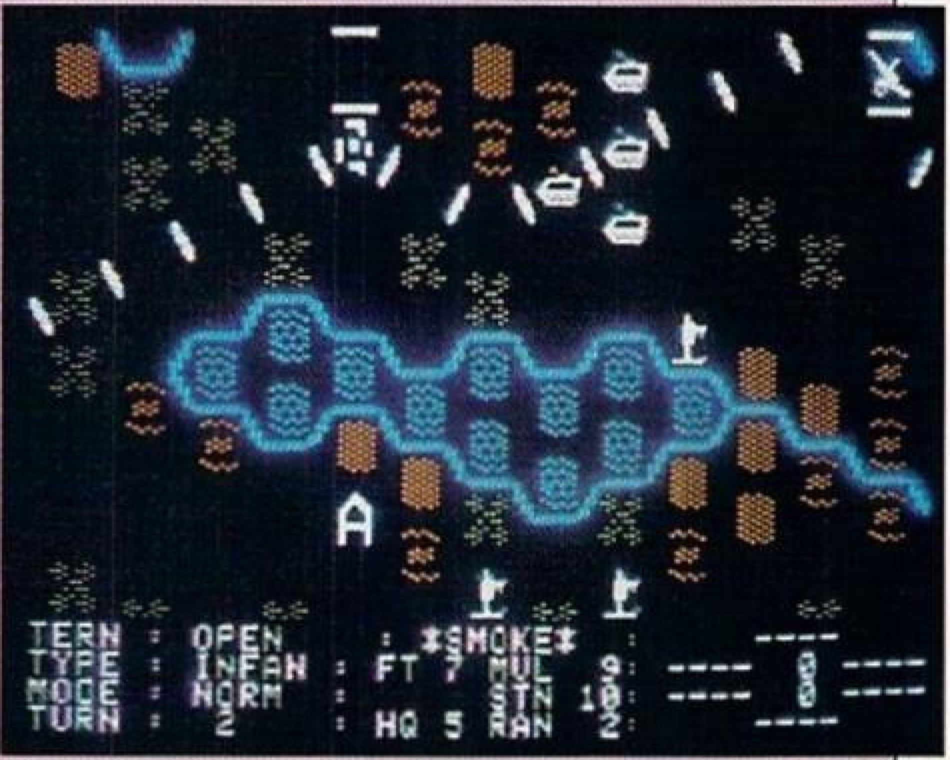

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TERN : OPEN   : *SMOKE* :      ----
TYPE : INFAN  : FT 7 MUL  9: ----  8 ----
MODE : NORM   :      STN 10: ----  8 ----
TURN :   2    : HQ 5 RAN  2:      ----
```

Norway 1985 is for the seasoned wargamer looking for new territory to conquer.

Norway 1985 is a war of "what if's." What if Russia invaded Norway and NATO counterattacked? What if the conflict would be confined to conventional warfare (no nuclear weapons), and you were commander of the NATO forces? What if you had to fight the war in the uncompromising environment of a Norwegian winter? What would happen? *Norway 1985* gives you a chance to find out.

If you enjoy complex strategy games, you'll delight in the many options and variables offered in this game. Individual military units can be instructed to move, attack, retreat, hide and fire either live ammunition or smoke canisters. Units can also call in air strikes and artillery support.

When commanding the NATO forces, your only chance for victory is careful planning and masterful handling of your troops. Before you dash into battle, study the placement of enemy troops and terrain. Since the Russian army is stronger than the NATO forces, you should wage a hit-and-run war. In other words, isolate Russian troops, overwhelm them with local troop superiority, then fade into the rugged, snow covered wastelands of Norway. Winter, in past wars, has always been the ally of the Russian armies. In *Norway 1985,* the hinges of success swing on the NATO commander's ability to turn that table and make the blowing snow an ally.

Battle is probable each time opposing units are sighted. The only sure way to win a battle is to overpower the opponent. If you can sucker an individual unit into an exposed position and attack, there is a good chance of destroying it. The trick is not to expose yourself to similar treatment. A perfect strategy is to coax a Russian unit into chasing you across one of Norway's frozen lakes, then blast it with mortar fire. The ice will break and the unit will sink into the icy water. Again, be careful not to be caught in your own trap.

Careful use of terrain is important. Mountains, while costly to travel through, are good positions to not only launch attacks from but to defend. Wooded areas will conceal your troops and make it easier to set a trap. Roads are great for fast movement, but increase the probability of being spotted by enemy troops.

Norway 1985 is the fourth in Strategic Simulations' "When Superpowers Collide" series. If you have played any of the others in that series (*Germany 1985, RDF 1985* or *Baltic 1985*), you're ready for this game. If not, be prepared to spend some time mastering the game's controls. The complexity of this game will intimidate most first-time wargamers.

There are important factors to consider before rushing into battle, such as terrain, movement points, strength, artillery range, air support, mode of travel, and combat effectiveness. Troops also react differently in night and day hours. To make mastering the game easier, *Norway 1985* offers three levels of play: novice, intermediate and expert. There are three play options as well: human against computer, human against human, and

Continued on pg. 120

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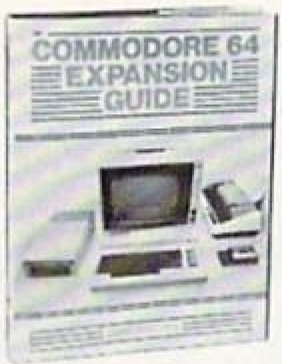

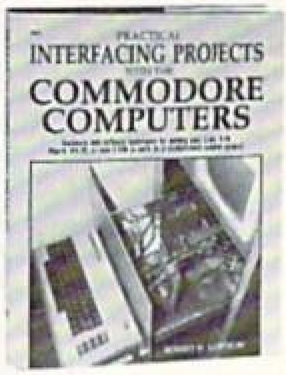

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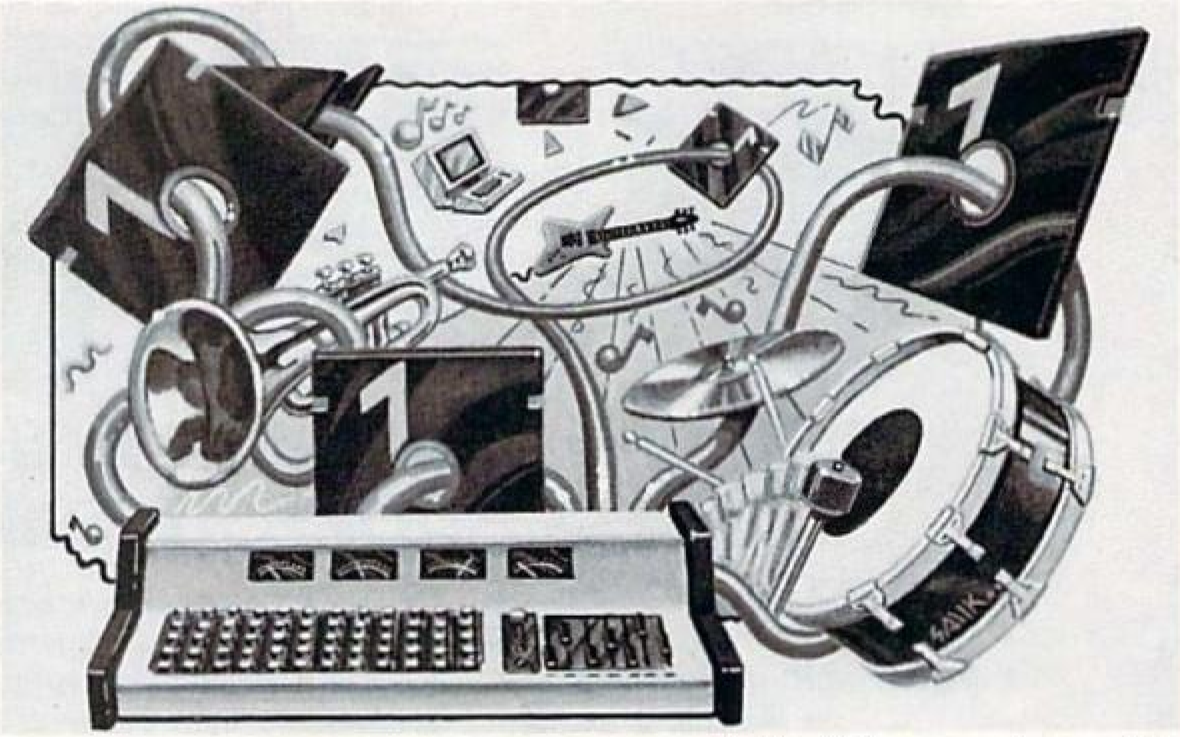
REVIEWED BY
DAVID R. BROOKS

Musical Grab Bag *for the Commodore 64*



It's a jungle out there in the music software market. Large, well financed companies have plenty of money to promote their products with full-color ads in all the computer magazines. Smaller companies settle for inconspicuous ads in the back, and hope for the attention of an interested magazine editor. Sometimes they get it—which is how I received this mixed bag of programs to review.

Euphony and Allegro

These music transcribing programs convert music into instructions for the Sound Interface Device (SID). In most other transcribing programs, conventional musical notation is used. *Euphony* and *Allegro* are different, however, since each has its own musical "language" that doesn't rely at all on conventional notation.

There is a good reason for using unconventional languages, because a user has control over many parameters when programming the SID chip that aren't considerations in conventional music. One way to write a music program is to merely duplicate conventional music, and accommodate the additional capabilities of the SID within a conventional framework. However, doing this tends to reinforce the traditional ideas about how music should be structured.

Instead, *Euphony* and *Allegro* create new environments built around the specific capabilities of electronic instruments. This could mean that the various functions of the SID might become notationally equivalent. That is, the command for "play a D" could have the same kind of syntax as the instruction for "turn on a filter." At worst, this kind of notation can be obscure, but at best, it fosters new ways of thinking about music and its notation.

Both *Euphony* and *Allegro* build their musical sequences in response to typed commands like V1 for "voice 1" or A for "play an A." The languages do have some similarities. *Euphony* incorporates commands into a BASIC program that consists entirely of REM statements followed by musical information. This way the musical sequences can be edited and saved as BASIC programs, and can be compiled into machine-language files to be played through the SID chip. Compiled music files can be very compact: one of the demonstrations on the *Euphony* disk is Beethoven's *entire* "Waldstein" piano sonata!

These relatively obscure music programs offer some unique and interesting music capabilities for your Commodore 64.

Allegro music commands are organized into "screens," each occupying one screen display on your computer. Both *Euphony* and *Allegro* have full-screen editing.

Euphony supports four voices, and the fourth one consists of SID volume commands that allow rapid dynamic changes while a piece is playing. However, except for this feature, *Euphony* is limiting, because virtually none of the SID's more interesting programmable capabilities can be used. For example, there is no provision for filtering, voice sync, or ring modulation. (Ed. Note: See "*Euphony* Update.")

If you're interested in an unconventional approach to music notation, I recommend *Allegro*. It's an ambitious program that gives full control over almost all the SID's functions. (I say "almost" only because no program I'm aware of provides full creative control over the SID frequency registers.) This program isn't for the casual user, because there is a lot of notation to learn. So if your interest is limited to transcriptions of conventional music, you will find other programs much easier to use. On the other hand, if you have a serious interest in applying the capabilities of the SID chip to sound effects and less traditional music, then *Allegro* is a serious attempt to give you the tools you need.

Allegro music files can be copied and played by others (with the aid of an auxiliary program that is not copy protected) without the use of the *Allegro* program itself. This encourages the exchange of musical ideas while giving the program's authors the protection they deserve.

Cantus

Cantus serves a much different function from traditional music programs, because it invents its own music according to a set of user-programmable compositional rules. One

Buyer's Guide to Music Software

Euphony Update

At the time that David Brooks wrote this article, *Euphony* was a very new product. Since that time, according to Jim Raymond, President of TCO Software, a number of features have been added to the program. These include:

- Graphics display showing a music staff and a keyboard, with notes that change color as they are played.
- Ability to accompany music with words.
- Commands for playing any portion of a piece of music, so you don't have to play the whole piece in order to debug one section.
- Ability to pinpoint timing errors.
- Use of just one symbol to repeat sequences of music.
- Complete control of the SID chip's filter parameters.

An enhanced version, *Euphony +*, also has the ability to print out musical scores.

of the authors, Michael Riesman, is a composer and performer with the Philip Glass Ensemble. Glass' music is full of repeating patterns evolving in ways that seem orderly, but at the same time are surprising—as though they were following a mysterious program of their own. If you've ever wondered how (or if) you can make music just by following rules, here is a perfect place to start.

Basically, you control the music by proscribing certain harmonic patterns and by specifying the probabilities of certain musical events, such as the duration of notes or the appearance of certain tones in a musical scale. To the extent that musical "style" is based on such restrictions, this program can produce music with a quality that's recognizable as jazz, twelve-tone music, or whatever.

The *Cantus* program disk contains several dozen sample settings of the harmony and probability tables. However, despite the imposition of a number of restrictions on the musical style, the results are lacking in structure. That is, there is no beginning, no development, no end, no sense of phrasing or motion toward any goal.

I found the "sound effects" settings to be more interesting. Some of them are quite soothing, similar to "environmental" recordings of surf or rain.

It isn't a criticism of *Cantus* to call its music boring. I would rather think of this program as a stimulus that gets you thinking about what's required to prevent the quantifiable components of music from being boring. This, after all, is at the root of music composition. If you like to think of yourself as a composer, first listen to *Cantus*. If you can't improve on its music, think again about what you should be doing with your life!

Because of the harmonic limitations of a three-voice synthesizer like the SID, I can't help but wish that a version of this program will be developed for more musically sophisticated software with four or more voices and, perhaps, an "expert system" approach to compositional structure. (The Amiga comes immediately to mind.) Still, this is an original and very innovative program that belongs in the library of every computer musician.

Chord-Power

Chord-Power provides another interesting use of the SID chip. It's simply a compendium of guitar chords that can be displayed on a graphic guitar fret board. As the finger positions are displayed, the notes sound. It is simple and effective. There are more than 8,000 chords, so you won't run out of possibilities any time soon. It does seem that the fret board is displayed backward on the screen, with the nut end to the right, but this is a minor criticism of what has to be one of the more original gift ideas for your guitar-playing, computer-loving friends.

Voice Master

Voice Master is a voice recognition and synthesis device (see review in March/April 1985 *Commodore Microcomputers*). It consists of a microphone and electronics that are connected to one of the 64's joystick ports. For voice recognition, you can "train" Voice Master to recognize up to 64 spoken words. The program analyzes the frequency content of sounds and then stores that set of parameters.

Compared to speech, musical pitches are relatively easy to analyze, so the music software included with Voice Master is essentially a freebie. When you hum, whistle, or play an instrument into the microphone, Voice Master isolates the fundamental frequency and instructs the SID chip to play along with you. You can alter the sound of the play-along voice, and it can play at any selected interval relative to your voice, not only in unison.

There's also a music composing utility included with the package. Just hum, whistle, or play a melody line, and Voice Master prints out a score on the screen as you go. Singing at the proper pitch is harder than it seems if you haven't had a lot of practice, so Voice Master has kindly provided an editor to clean things up a bit before you save the melody. You can't however, build polyphonic compositions with this program.

I'm not sure you would want to buy Voice Master just for the music software, because it certainly isn't intended to take the place of full-featured music programs. But as part of a rather sophisticated package, this program is yet another innovative use of the 64's sound capabilities.

These relatively obscure programs offer some unique and interesting music capabilities. They deserve your attention, even if their ads aren't very big! All programs were written for the 64 and are compatible with the 128 in 64 mode.

Allegro
Artworx
150 North Main Street
Fairport, NY 14450
Cantus
Algo-Rhythm Software
176 Mineola Boulevard
Mineola, NY 11501
Euphony
TCO Software
P.O. Box 81504
Fairbanks, AK 99708
Chord-Power
NewArts
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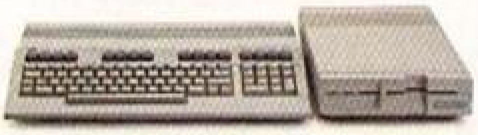

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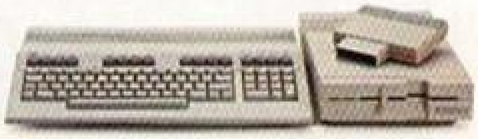

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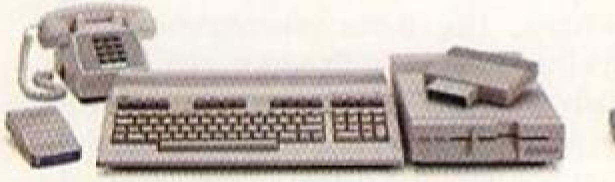

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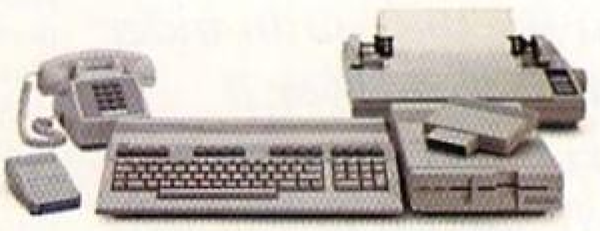

THE COMMODORE 128 LEARNS TO WRITE.

Looking good in print could be your next move with the MPS 1000 Printer. It's a new dot matrix printer designed to make the most of the 128's high-resolution graphics because sometimes pictures speak louder than words. But it's no slouch when it comes to words. The MPS turns out about 1200 words a minute (100 cps) of draft-quality printing, or gives you near-letter-quality printing at nearly 240 words a minute (20 cps). And you can choose printing styles, use international characters, even make up your own symbols.

THE COMMODORE 128 IMPROVES YOUR VISION.

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All these evolutionary steps ahead won't set you back when it comes to paying for them. Additions to your Commodore 128 are available at a store near you and are as affordable as the 128 itself. We think that's a smart way to help you build a computer system.

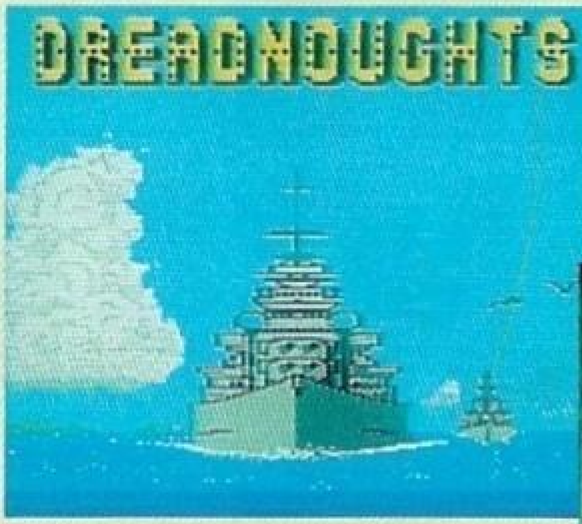
COMMODORE 128 PERSONAL COMPUTER

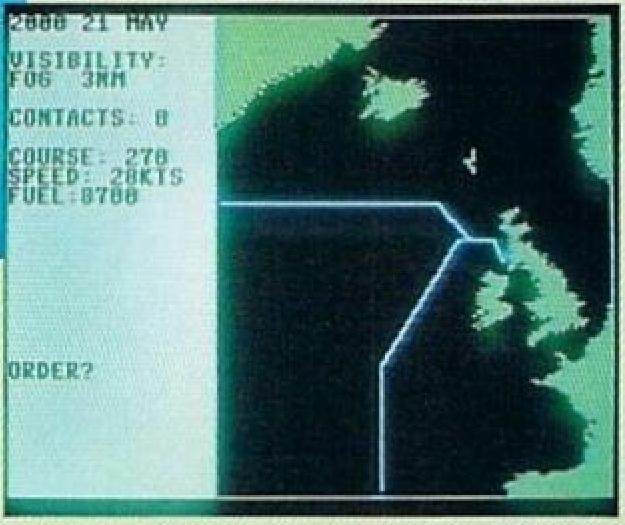
A Higher Intelligence

REVIEWED BY JEFF SEIKEN

Dreadnoughts

Computer: Commodore 64
Publisher: Avalon Hill
Microcomputer Games
4517 Harford Road
Baltimore, MD 21214
Medium: Disk
Price: $30.00





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The hunt for the Bismarck was a classic situation of cat and mouse. Under the cover of heavy fog, the Bismarck slipped out of her berth in Norway during the night of May 21, 1941, accompanied by the heavy cruiser Prinz Eugen. Their objective: raid and disrupt Allied shipping in the North Atlantic. Two days later, a British cruiser sighted the two ships in the Denmark Strait west of Iceland, but they escaped after a brief battle which cost the British the battlecruiser Hood. A flying-boat, however, spotted the Bismarck again, now steaming alone, on May 26. The Royal Navy battleships King George V and Rodney finally cornered the Bismarck the following day and reduced her to a floating hulk within 90 minutes. Two torpedos finished the great warship.

Dreadnoughts covers the week-long chase of the Bismarck, as well as tactical naval combat in the North Atlantic through the early years of World War II. In the solitaire Bismarck scenario, only one role is open to the player—that of the hunted: the captain of the Bismarck. *Dreadnoughts* also includes a two-player tactical game in which the players create task forces and then match them.

The hunt for the Bismarck requires strategy, and uses a variety of screen displays. The main display features a high-resolution map of the North Atlantic, depicting the land masses and coastlines in the area, plus the British convoy lanes and the route the Bismarck has followed thus far in the game. Oddly enough, the Bismarck's path appears in the same shade of green as the pieces of land. While this has no effect on play, in terms of aesthetics, it can be a bit disconcerting to see the coast of Norway sprout what looks like a twisted antenna as the Bismarck heads further out into the Atlantic.

You are the commander of the World War II German battleship. Your early success or failure in eluding the unseen British ships will determine the course of the remainder of the game.

The turns are hourly and pass in semi-real time, meaning that the game clock ticks along until you choose to stop it and enter new orders. As captain of the Bismarck, you direct the battleship's course and speed. You can also launch search planes or choose to patrol an area for a certain number of hours, which is useful when you are looking for convoys. Victory depends on how much damage you can wreak on the Royal Navy and England's precious convoys. The game ends when the Bismarck meets a watery death or manages to return to port.

Should the Bismarck and Prinz Eugen enter into visual range of any part of the Royal Navy, then you have the option to switch to the Battle Program. Additionally, when British battleships make visual contact with the Germans, the game automatically shifts into the Battle Program (i.e., the British attack). Turns now represent four minutes apiece, and the screen presents a tactical display map showing the location of the German and British ships.

Each turn, you enter maneuver orders for the Bismarck and Prinz Eugen and assign targets to their primary and secondary guns. The computer then executes the German and British maneuver commands and determines the results of gunfire. Damage depends on the speed and armor of the target, the size of the firing guns, and other factors. The screen displays the effects of each hit on a cleverly arranged damage chart for the target, which reveals at a glance the amount of punishment the ship has sustained. A ship sinks when it has incurred enough hits to reduce its hull status to zero. Hits can also destroy primary and secondary guns, as well as reduce some of the ship's capabilities, such as radar or maximum speed. It is even possible to sink a ship with a single salvo if a shell penetrates one of the powder magazines, as actually happened with the Hood. The Battle Program ends and returns to the Strategic Phase once no opposing ships remain in visual range.

The two-player tactical game plays identical to the Battle Program, except that the players select the composition of their squadrons and set the range at which the engagement begins. Players have a roster of ten German and 34 French, British, and American ships to choose from, which allows some interesting historical and imaginary situations to be explored. One of the more intriguing "what-if" match-ups would have been if the Bismarck has sortied with her sister ship Tirpitz and met a squadron of British battleships and battlecruisers. Unfortunately, however, there is no solitaire option in this part of the game.

The blurb on the back of the game box rates *Dreadnoughts* a seven on a complexity scale of one to ten (ten being the highest), but this seems overstated. The well-illustrated instruction manual contains only three and a half pages of actual rules, and learning to play the game takes about 30 minutes or less. The rules, however, purposefully do not explain all of the program's nuances and some unpleasant surprises await the Bismarck and Prinz Eugen in the North Atlantic.

Dreadnoughts also contains some nice touches that add a dose of history to the game. For instance, when search planes launched by the Bismarck become lost, you have the option to break radio silence and guide them home, although this also holds the risk of cluing in the British to your location, too.

Playing the solitaire Bismarck scenario is like walking down a busy street wearing earplugs and a blindfold—you know there is a lot of activity going on around you, but you have no idea exactly what. The first 24 hours are invariably the most interesting, as your early success or failure in eluding the unseen British ships will determine the course of the remainder of the game. To win, the Bismarck needs to pass undetected into the convoy lanes and sink a minimum of one convoy. A southwesterly course offers the most direct route from the German battleship's berth in Norway to the convoy lanes, but players who try this direction will swiftly learn the one cardinal rule of *Dreadnoughts*: The shortest path between two points is not necessarily the best.

Historically, the Bismarck made an end run around the west coast of Iceland, and experience shows that this course presents probably the best possibility of escaping early detection. A dash between Iceland and England is a worthwhile alternative, but should only be attempted under the cover of night. Should the Bismarck be found, she can usually survive one encounter with the British battleships, but the damage likely to be incurred will make a second meeting fatal. In that case, after beating off the first British attack, the Bismarck should abandon any thoughts of raiding commerce and instead steam for the nearest friendly port. If the Bismarck survives, at least a marginal victory might still be salvaged.

Dreadnoughts *covers the week-long chase of the Bismarck, as well as tactical naval combat in the North Atlantic through the early years of World War II.*

While *Dreadnoughts* manages to cover most of the important aspects of its subject, certain simplifications reduce the realism and accuracy of the game. For example, although the Bismarck and Prinz Eugen parted company several days after leaving Norway, in *Dreadnoughts* the two must still be kept together. Furthermore, in the Battle Program, light cruisers and destroyers do not have the ability to fire torpedos, which deprives these ships of their most lethal weapon and makes them little better than floating targets.

Convoys also do not behave in a very realistic fashion. When caught by the Bismarck, the destroyer escorts, apparently graduates of the Bob Hope school of valor, will immediately use their superior speed to flee the scene. Of course, since the destroyers have no torpedos and cannot generate smoke, their presence would make little difference anyway.

The merchant ships, in turn, are represented on the tactical map display by a single master-convoy marker. This means that the individual ships cannot disperse, and must continue to sail alone in tight formation like eggs in a carton waiting to be smashed. Altogether, this results in convoys being too easy to sink in far too little time. Even the larger convoys can typically be dispatched in under two hours. In contrast, when the Gneisenau and Scharnhorst attacked a North Atlantic convoy in March 1941, it took the German battlecruisers *two days* to sink 16 vessels.

The compromises with history can be forgiven, but *Dreadnoughts* also falls guilty of another crime for a computer game—too much dead time. The chief offender is the sequence that occurs whenever a British ship comes within radar range of the Bismarck and the computer provides a radar/visual display. All of the other displays used in the game appear on the screen almost instantaneously, except for this one, which takes about 20 seconds to print out. By the time the computer shifts back to the strategic map display and the Bismarck begins moving again, another 20 or so seconds will have elapsed. Moreover, when British cruisers follow the Bismarck, the computer tends to interrupt movement automatically every turn to print an update of the display.

What compounds this problem is that once the Bismarck has been spotted, there are very few game decisions to make. Changing course or speed will not help the Bismarck escape the radar-equipped cruisers. Trying to sink the cruisers in battle will not work either because of their speed and unwillingness to fight. The only option that remains is for the Bismarck to continue steaming towards whatever her objective might be while waiting for the probable appearance of the heavier elements of the Royal Navy. Thus, the pace of the game slows down to a crawl at exactly the point where you as the player have the least to do or think about.

Even with the constant pauses, most games will last only between one to two and a half hours, depending on how soon (if ever) the Bismarck is found. For players blessed with patience, *Dreadnoughts* should provide enough action and drama to offset the numbing effect of the periods spent staring at the screen and waiting for the computer.

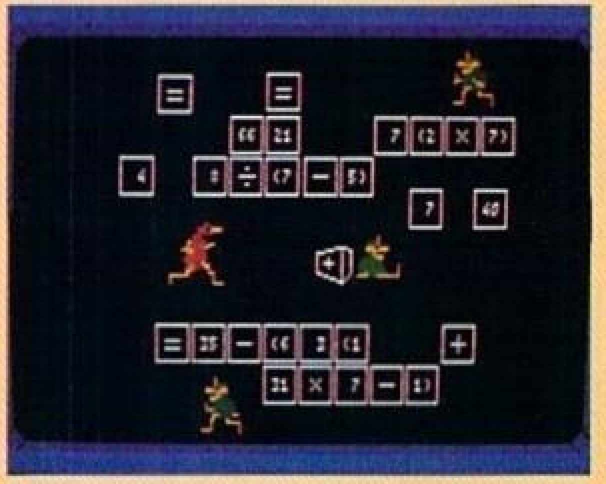
REVIEWED BY GARY FIELDS

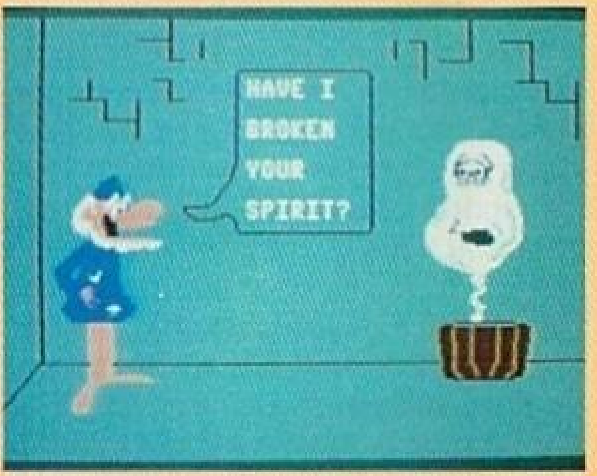
Wizard of Id's WizMath and WizType

Computer: Commodore 64
Publisher: Sierra On-Line
P.O. Box 485
Coarsegold, CA 93614
Medium: Disk
Price: $24.95 each

Developers of educational software face a dilemma. If a program emphasizes academia too strongly, children will avoid it. But if they try to put too much fun in the game, the teaching value can be lost. Happily, *Wizard of Id's WizMath* and *WizType* are a fine mixture of both. They are programs that are both educational and fun, featuring the characters from the Wizard of Id comic strip to balance fun and learning.

> *Because* WizMath *and* WizType *disguise teaching so cleverly with sound and action, children never suspect that they are being educated.*





WizMath

First the child is asked to enter his or her name and age. The program uses this information to keep track of each player's personal statistics. Each time the child plays *WizMath*, his or her previous progress is displayed in bar form, and the statistics are automatically updated on the game disk after each round of play.

The age information is used to set the skill level. The older the user, the harder the lesson. From one to six players can compete at the same time, and because the skill level is determined by age, a 30 year-old parent can compete with a 10 year-old without unfair advantage. Although the program is designed for users eight and older, younger children with parent supervision can understand and benefit from the lower skill levels of *WizMath*.

As *WizMath* begins, Spook is locked deep in a dungeon made of large blocks. By moving a loose block in his cell, Spook can escape into the 14 different levels above. When he enters a room, he sees several blocks with numbers or math symbols on them. He must move the blocks using either keyboard or joystick until they form a true equation or complete one already present. When he successfully does this, the door on the right of the room will open so he can explore more of the dungeon.

As the child explores the upper levels of *WizMath*, jailers try to catch Spook. They can be avoided by fast movement or disabled by kicking a block against them. I found the inclusion of jailers both a plus and minus. They do increase the game's challenge, since coping with the jailers forces the child to think quickly. To win, the child must not only solve math problems, but do it under stress.

These "cops and robber" type chases do add to the excitement, especially when several people are competing. But when a child is learning a new concept, like hexadecimal numbers, the distraction of constantly running from jailers makes it difficult to concentrate on solving the equations. The only way to eliminate a jailer from the game is to trap him behind blocks. Only then can the child concentrate on the math problem.

WizMath has 12 skill levels. The easiest requires the child to simply identify numbers and the most difficult is Boolean algebra. The other ten levels are addition, subtraction, multiplication, division, exponentiation, parentheses, order of operations, binary, hexadecimal, and an introduction to variables. The remaining two levels (13 and 14) allow you to design, save and play your own math games.

The *WizMath* manual is a 32-page math primer that explains the principles of each math operation in a surprisingly brief and understandable fashion. Each page displays a graphic illustration or example equation, as well. The program disk, manual and reference card all fit into a neat bookshelf-type box, which both protects the disk and stores easily.

WizMath is a well designed educational program. Children will enjoy playing it because it's fun, while parents or teachers will be delighted with the serious math relationships it teaches.

The ability to create your own games is a valuable and powerful teaching tool included in the program. This option makes it easy to add and practice specific math concepts the child is studying in school or having difficulty understanding.

This game covers a lot of math territory: everything from simple addi-

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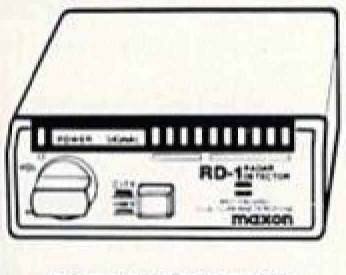

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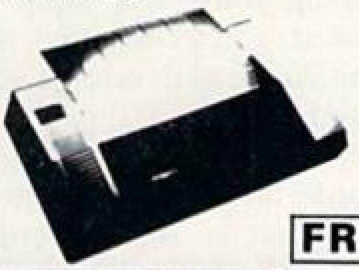

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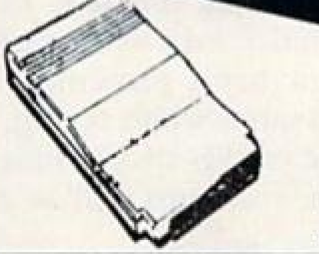

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tion to subtracting negative numbers to algebra. Unfortunately, it does not include drills in fractions or division by uneven numbers. But *WizMath* can help your children learn a lot about math, including computer-related math skills like conversion of binary and hexadecimal numbers. I suspect you will be delighted with *WizMath*.

WizType

One of the most useful skills anyone can master is typing. Learning it, however, usually requires hours of tedious drill. But no more. Now there's an enjoyable way to learn to type.

The day my copy of *WizType* arrived, my eight year-old daughter was entertaining a friend. Just as I finished reading the manual and loaded *WizType*, she and her friend walked by the door. As soon as they saw the screen, they recognized the cartoon characters on the screen and stopped. As they watched, the Spirit (who lives in the wine vat) rose, turned into a fire-breathing dragon, and cooked the Wizard down to a pile of grey ashes.

With her eyes glued to the screen, my daughter wedged her body between the computer and me while her friend pulled over a chair. Together they barricaded me from my own keyboard. But while they were playing, they were also learning to type. Because *WizType* disguises teaching so cleverly with sound and action, they never suspected.

Like *WizMath*, the child enters her name. Next, the child can either try one of the four practice levels or play "The Game." "The Game" is the real child pleaser. On the left of the screen appears the Wizard. On the right is the wine vat containing the weary-eyed Spirit. But the Spirit doesn't remain weak and weary-eyed long. As the child watches, the Spirit evolves into a fire-spitting dragon. As this transformation takes place, letters and words appear in the space between the Wizard and the Spirit.

If the child can successfully type the displayed words, the Wizard will spring into action and zap the Spirit. If the child types the words faster than the Spirit can make them appear, the Wizard wins and with a bolt of lightning zaps the Spirit back into the wine vat. Though it may sound a little rough, it is done with comic-strip humor. And remember, Wizard knows all about magic, so he reappears quickly, none the worse for wear.

The graphics, comical expressions and sound of *WizType* are all top drawer and should have most children eager for more. There are four practice modes: Drill, Practice, Words and Paragraphs. If the child tires of typing the paragraphs and words prepackaged with *WizType*, she can easily create her own files. An additional user-created file of 240 words is possible.

Another real child pleaser is the appearance of Bung, the land of Id's red-nosed, fun-loving court jester. If the child wishes, Bung will jump along sentences at a user-selected speed. This helps the child develop a smooth typing rhythm.

The child can "play" typing two-letter words, longer words, sentences or paragraphs. As the student gets better, the game gets tougher. The program records each user's skill level and adjusts the speed and difficulty levels according to ability. This feature is a major plus. It encourages each student to beat their own score, and no child is forced to perform either beyond or below their own skill level.

The *WizType* manual is simple but complete. The six pages briefly describe each mode and option. It also suggests some good typing habits. Even young readers should have no trouble understanding this one. Color-keyed illustrations show the proper posture and hand placement a child should assume while typing. A quick-reference card is also included. For most users, this card will be all that is needed.

This is an outstanding educational program, and includes the ability to add words or paragraphs, which is a valuable and powerful feature. This option makes adding and practicing spelling lists, poetry, the lines in a school play or Bible verses, easy.

Fun is what makes *WizType* well worth $34.95. The best teaching program in the world isn't worth the price of a blank disk if children won't use it. My daughter likes *WizType* because it is fun. I like it because she's learning while she plays. What more could you ask? ■

REVIEWED BY CHRISTINE ADAMEC

The Newsroom

Computer: Commodore 64
Publisher: Springboard
7808 Creekridge Circle
Minneapolis, MN 55435
Medium: Disk
Price: $49.95

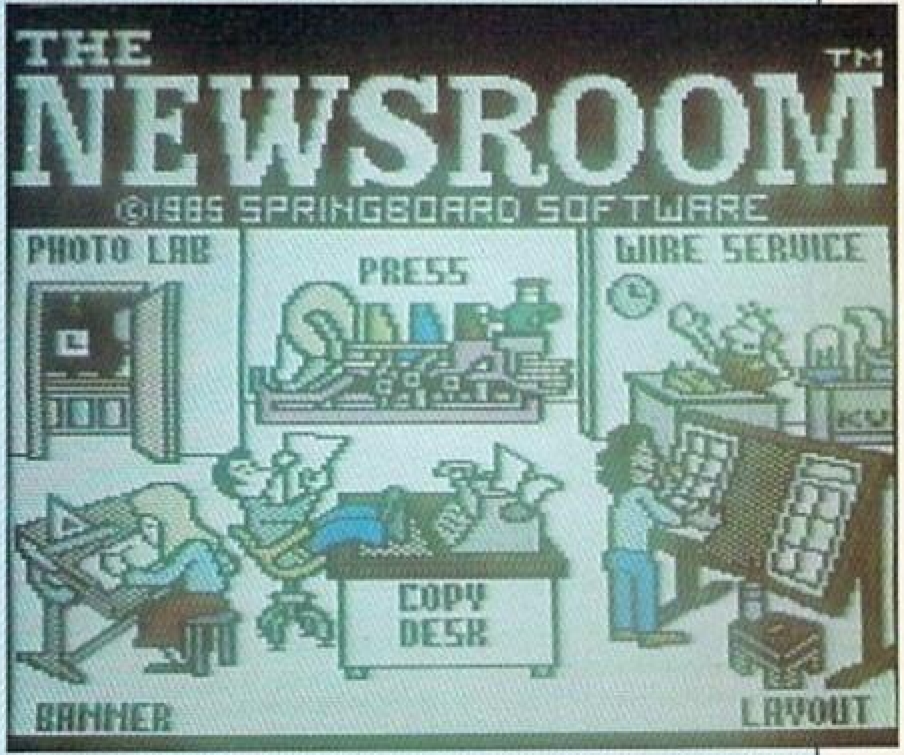
News flash! Springboard's *The Newsroom* is now available, and aspiring reporters and editors throughout the country are creating their own newspapers as we speak. (Eat your hearts out, Lois Lane and Perry White.) If you or your children are not using *The Newsroom,* maybe you should be! This program is truly outstanding. It's educational and it's also tremendous fun.

What is *The Newsroom?* It's a program that lets you create your own newspaper, complete with banner, headlines and stories, as well as graphics. You lay out your pages and then print them—and if you have a modem, you can send your story over the "wires" to a friend. A tremendous amount of detail went into designing this program, because not only can you choose from over 600 high-resolution graphics to illustrate your newspaper, but you can also change these pictures, draw your own, and add patterns.

The Newsroom comes with two disks: the program disk and the clip art disk. The main menu is comprised of picture/word options: photo lab, banner, press, printing press, copy disk, wire service, and layout. A menu of symbols (icons) are displayed on the left side of your screen. For example, use the trashcan if you'd like to erase your last action, and so on. Use your joystick to access the icon you need.

First choose a banner (name and heading) for your newspaper. Call it the *Daily Planet,* call it *Martians Today*—it's your choice. Next you can add a picture to your paper's banner. For example, I'm sick of reading about murders and other heinous crimes, so I created the *Friendly News,* a simple banner headed by a teddy bear logo I chose by scanning the available graphics in the manual. To get my teddy, I selected the "clip art" icon on the banner's menu and was instructed to insert the clip art disk. I now perused the graphic selections available, which included my teddy bear and seven other choices. Moving the cursor to the bear, I pressed the joystick button and the bear reappeared alone on the screen.

The Newsroom *lets you create your own newspaper, complete with banner, headlines and stories, as well as an array of graphics.*



My only criticism of clip art was that I occasionally wished I could shrink or enlarge a graphic. Changes to various sections of an individual graphic are possible, but I couldn't figure out how to magnify or shrink a figure intact. So if my "photo" was too large, I saved it as an entire panel of my newspaper, placing the text in another panel.

I then used the crayon symbol to choose my typeface and the graphic tools window appeared, enabling me to select the right font for me. (Font refers to type size and style.) Five options are provided—even a fancy English style. Then I moved to "exit" and found myself back to the design screen, where I typed my paper's name. After you've completed the editorial part of your banner, you'll want to save it, so you'll need a blank disk. You don't have to pre-format that disk, because this program will do it for you.

Now on to the "photo lab," where you choose one of the program's graphics—or one you've made yourself—and "take a picture." The manual shows what graphics are available. There are also picture menus of bugs, maps, kids, even a graphic of Visa and Mastercard credit cards, as well as words like "SALE" and "SPECIAL NOTICE."

Move on to the camera icon, press the joystick button, and move back to the main screen to "frame" the picture. Press the button and your picture turns black for an instant—you've taken the photo! (I really liked that "flashbulb" effect.) Now save your picture to disk.

You can also turn individual pixels on and off, observing the changes at the bottom of your screen. And you can "oops" a mistake with the icon by that name. I also liked the capability to "flip" a figure. For instance, say a graphic is facing right and you want it turned to the left. Use the arrows icon to switch the figure around.

The copy editing option lets you combine text and photos to design a panel of your newspaper page. (If you run out of time, you can save your text and edit out the typos later.) You can put up to six panels on a page (plus a banner) if you use 8 1/2" by 11" paper, or eight panels if you're using 8 1/2" by 14" paper. After completing your text, move to each panel of your layout, press the joystick button, and see a listing of available files

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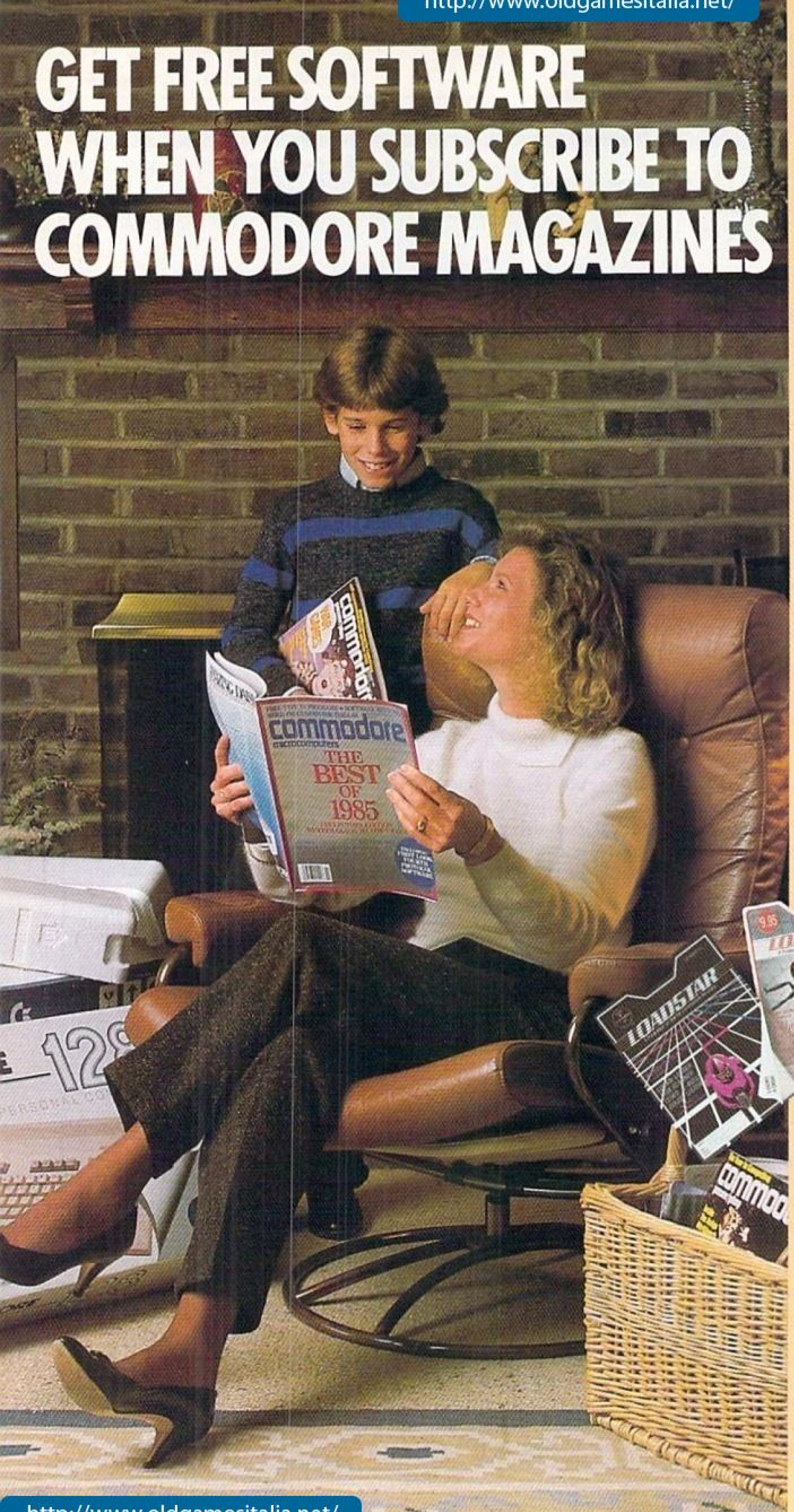

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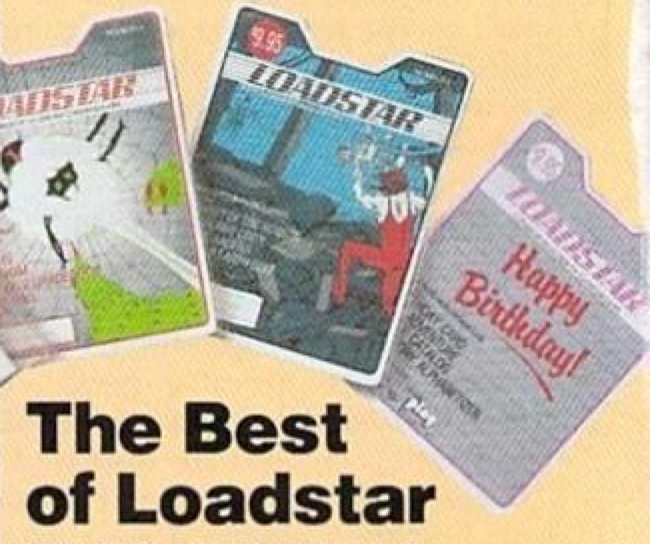

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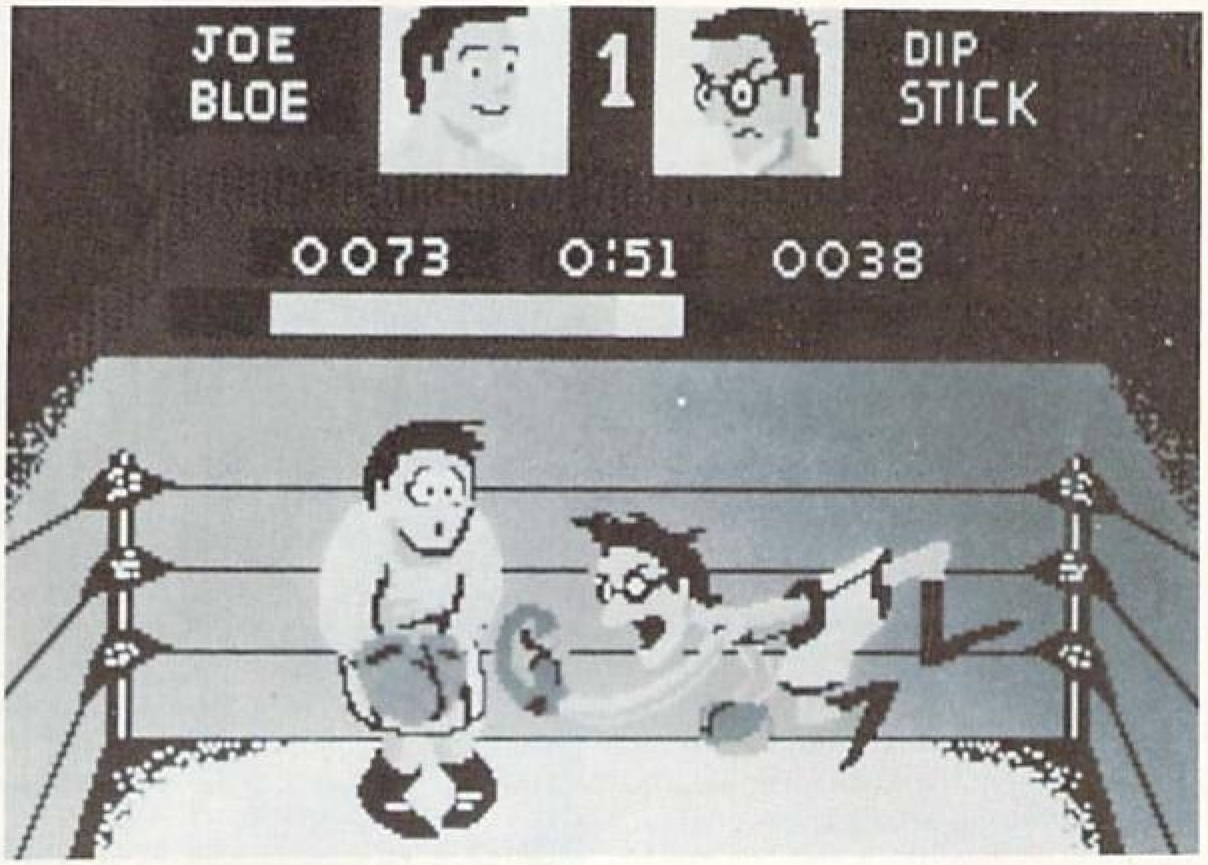
REVIEWED BY SCOTT A. MAY

Fight Night

Computer: Commodore 64
Publisher: Accolade
20863 Stevens Creek
Boulevard
Cupertino, CA 95014
Medium: Disk
Price: $29.95



Fight Night is a perfect example of how cute and whimsical games need not be silly or juvenile. This arcade-style boxing game packs a punch in more ways than one. On one hand, its tough-as-nails action will leave your pulse pounding and your hands sweating. On the other hand, its hilarious characters and graphic surprises will have you laughing almost to tears. Any way you look at it, *Fight Night* is not your average computer sports simulation.

The program begins with a menu screen listing five available options. The first selection is the main event, Boxing. This contest pits one player against the computer's top five. The objective is to fight your way through the ranks, ultimately leading to a slug-out with the Champ for the title crown. Along the way, you'll meet some pretty bizarre characters, each one tougher than the last. When the going gets tough, all five computer opponents resort to foul play in the form of a Super Blow. These blows are devastating to your fighter, yet hilarious to watch.

The first boxer you must contend with is aptly named Dip Stick, ranked number four. Described as a "mouth breather" and a product of "anorexic training methods," Dip Stick is a 90-pound little twerp who specializes in low blows. Although he's not too hard to put away, watch out for his Super Blow—a below-the-belt smash that causes your fighter's legs to cross and eyes to bug out. My first reaction was "I can't believe he did that!" Believe me, it gets ever better.

Ranked number three, the next boxer is called Kid Kastro. Complete with cigar clenched between his teeth, army fatigue cap and beard, it's not hard to imagine who this character was modeled after. His Super Blow is knows as the Castinet Crusher, accomplished by pounding your fighter's head on both sides at once.

When the going gets tough, all five computer opponents resort to foul play.

The third boxer on your way to the top is called Hu Him, the cement-headed Far East champ. Recalling his Kung Fu roots, Hu Him's Super Blow is a vicious kick to the diaphragm. These kicks are a sure way to lose your lunch, not to mention the fight.

Ranked number one is the British Bulldog, a former lamp post who only recently learned to walk erect. This heavy hitter is famous for his Super Blow, the British Rail Roundhouse. The lucky recipient of these blows will discover the true meaning of "rubber neck." Your fighter's body stays motionless but his head goes sailing out of the ring.

The last obstacle between you and ultimate victory is the Champ, known as the Bronx Bomber. Built like a bus, the Bomber creamed Darth Vader to win his title. Your fighter will literally have to untie his shoes to eat after experiencing the Bomber's Super Blow. Defeat this walking monolith and you deserve the title crown.

There are four other modes of play available from the menu screen: Construction, Training, Sparring and Tournament. The Construction mode allows you to build your own boxer, choosing from six different head, body and leg styles. Construct a muscle-bound hulk if you like, or a boxer with a thick chest and chicken legs. The combinations are many. In addition, you can choose from 16 colors for his gloves, shorts and skin. Your final result can be either player- or computer-controlled.

Next, you must define your fighter's boxing skills—a ratio between power to and resistance from blows to the head and body. This will determine if your boxer throws a mean body punch or has a glass jaw. Computer-controlled fighters must also be programmed for the percentage of brains vs. brawn, and whether they are primarily offensive or defensive boxers. When all the fine tuning is complete, you can give your fighter a name and save it to disk for future bouts. There are enough variables to create dozens of unique contestants.

Another selection available from the menu screen is the Training Camp. This option is designed mostly for beginners to practice joystick movements. *Fight Night* uses a sophisticated method of scoring that rewards skillful maneuvering and discourages boxers from simply standing

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REVIEWED BY DAN GUTMAN

Mind Over Minors

Computer: Commodore 64
Publisher: Human Edge Software
2445 Faber Place
Palo Alto, CA 94303
Medium: Disk
Price:

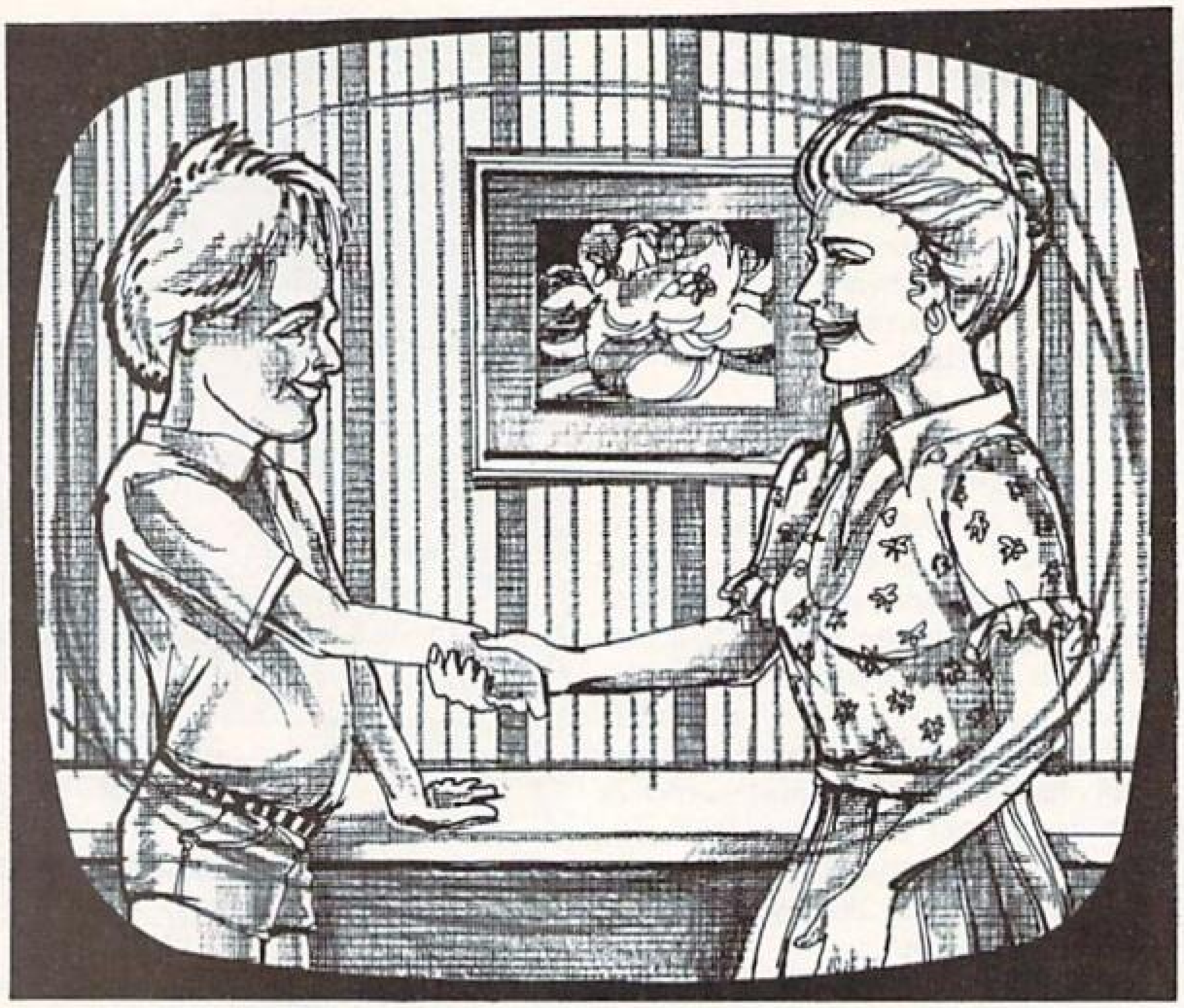
What can you do when your kids misbehave, disobey, eat too much junk food, and generally drive you crazy? Perhaps you could try Human Edge Software's *Mind Over Minors.* (I'll call it *MOM* for short.)

Last year, Human Edge gave us *Mind Prober,* the controversial program that stopped just short of claiming it could read the mind of a stranger. (Remember their ads—"Read Any Good Minds Lately?") *MOM* doesn't go quite that far—it merely claims to help a parent identify a child's strengths and weaknesses and improve the parent/child relationship. Both programs utilize artificial intelligence techniques, and *MOM* was created with the help of experts in the field of child psychology.

Here's how it works—the parent is presented with a list of 96 adjectives that might describe a person. "Aggressive," "high-strung," "organized," "stubborn"—that sort of thing. For each word, you hit a key to indicate whether the adjective describes you or not. When you're finished, you do another assessment of the same words to describe your child.

Based on your choices, the computer constructs a psychological profile of parent and child. You receive a "Strategy Report"—specific advice to help you understand your child, improve communication, increase the child's performance, and improve discipline techniques. The program stores assessments of ten children.

The theory makes sense. While a book of child psychology gives advice for any parent and child, a computer can give *specific* advice for you and your child. By matching up a personality profile of two particular individuals, the computer should be able to show where the personalities might clash and what to do about it.



Mind Over Minors *is designed to identify a child's strengths and weaknesses and try to improve the parent/child relationship.*

I tried *Mind Over Minors* with my two nephews, Adam and Nathan. The program was pretty much on the money with Adam. It described him as clever, confident, a natural leader and that "keeping pace with his active lifestyle can require a lot of effort." That's for sure. Half the time, Adam is bouncing off the walls. The program suggested a few good techniques to control Adam's energy.

But *MOM* missed entirely with Nathan, who has a quiet, unassuming personality compared to Adam's. The computer claimed that Nathan wants to be the center of attention, and that "his confidence may occasionally become so strong that you find your own authority challenged by him." It couldn't be further from the truth.

I was disappointed that *MOM* wasn't more insightful. It gives a lot of advice that could apply to *any* child. At various times the program instructed me to try to make learning fun, reward good behavior, and to dish out punishments in private rather than in front of friends. Any book on child rearing will say those things. In fact, the program comes with an excellent book, *Managing Children.*

My own feeling about *Mind Over Minors* is that I'm not entirely convinced it's possible to sum up a human being with just 96 adjectives. The program's accuracy depends entirely on the parent's assessment of his or her own personality and that of the child. What if that assessment is off the mark? Then the whole psychological profile may be thrown off, and the Strategy Report will be giving the wrong advice.

In other words, if you're an excellent judge of your personality and your child's personality, the program may help you with your child. If you're a poor judge, it's probably useless. In any case, I don't think that child psychologists have to worry about being replaced by computers just yet. C

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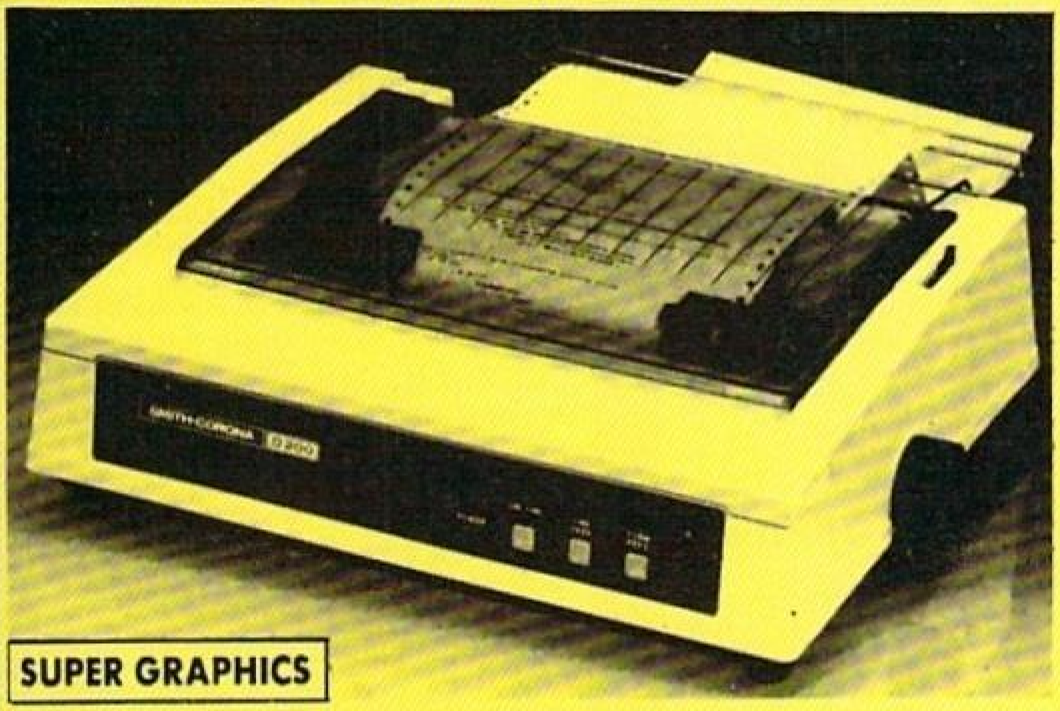

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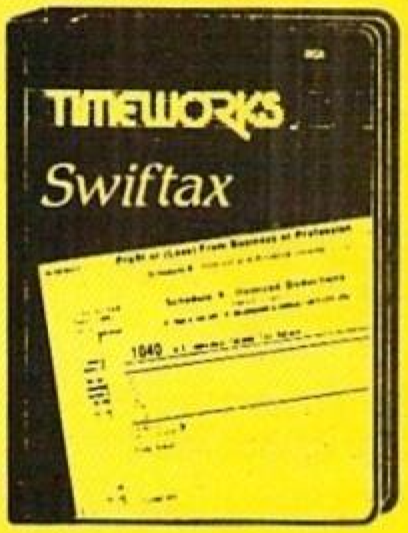

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REVIEWED BY STEPHEN S. LEVEN

SuperScript

Computer: Commodore 128 and Commodore 64
Publisher: Precision Software
Progressive Peripherals and Software (Distributor)
464 Kalamath Street
Denver, CO 80204
Medium: Disk
Price: $79.95 for either version

A word processor is a writing tool—a program that, theoretically, helps release your writing creativity by allowing you the freedom to rearrange, rewrite, and re-edit text to your heart's content, and by freeing you from such drudgery as erasing typing mistakes. However, many word processors get in the writer's way. Some are too limited in scope, lacking many of the advanced features that really ease the writing task, while others are so complex that it's hard to remember the proper commands.

I've been using Commodore's *EasyScript* on the Commodore 64 as my main word processor for several years, even though I had tried others. I always felt that *EasyScript* was the "ultimate" word processor, supplying most of the features I thought I'd ever need or want.

But *EasyScript* isn't perfect, and I found myself looking for a word processor with all the good features of *EasyScript*, none of the drawbacks, and with commands that even I could learn and remember! Then recently I was introduced to *SuperScript*, which has separate versions for the Commodore 128 and Commodore 64. *SuperScript* is published by Precision Software, the same British firm that wrote *EasyScript*. (Precision Software also wrote *SuperBase 128* as well as *SuperBase 64*, database managers.) But *SuperScript* is more than just a mild upgrade of *EasyScript*, a slight improvement on a proven, highly successful program. *SuperScript* is a *programmable* word processor.

Whopper of a Program

When I first picked up *SuperScript*, I was intimidated by the size of the 234-page manual, and by the program complexity that usually goes along with such a volume. However, the more I worked with *SuperScript*, the more I realized that this was the program for me.

> *In* SuperScript, *you can program any text, function, or series of functions you want to any of the computer's keys.*

SuperScript is a word processor geared to all levels of users, although I strongly recommend that those who have never used a word processor before start with a simpler program. The manual begins with a set of tutorial lessons, and indeed one of the selections on the opening menu allows you to create a training disk for use with the tutorials. *SuperScript* can be menu driven, or you can enter commands from the keyboard. It contains reasonable default settings for page formatting, so you can start out writing and printing text with almost no experience, or you can learn to use all the editing controls to tailor a document to your exact specifications.

The *SuperScript* manual is clear and concise, taking the reader step-by-step through the process of learning the program. The tutorials, complete with practice exercises, walk through most of the common, and not so common, commands. The manual includes a reference section describing each command in detail, and a programming section, which teaches the reader how to get the most out of the program. One item noticeably absent from the manual, however, is a comprehensive reference card, although the 128 version includes a rudimentary reference chart.

The *SuperScript* package includes one copy of the program disk (backup copies are available for $20) and the manual. Both the 128 and 64 versions operate almost identically. In discussing *SuperScript*, all features, methods of operation, and comments apply equally to the Commodore 128 (in either 40- or 80-column mode) and Commodore 64 versions, unless I specifically state otherwise.

Test Driving *SuperScript*

Let's take a look at how *SuperScript* operates. All features can be accessed from a series of menus. The first menu appears at the top of the screen when the F1 function key is pressed. Moving the cursor to highlight a particular choice causes an explanation of that choice to appear on the screen, and pressing RETURN then executes that selection. Many of the selections produce additional menus, where more choices must be made.

For example, to load an existing text file from disk, press F1 to obtain the menu. Move the cursor to highlight "Document" and press RETURN. A new menu appears. The word "Load" is already highlighted, so just press RETURN. You are then prompted for the name of the document to load. If you can't remember the name of your document, press the space bar, and the disk directory will be displayed on the screen. Move the cursor to highlight the file you want, press RETURN, and the file will be loaded.

After moving the cursor around the menus a few times, you'll surely want a quicker way to process your words. Once you are familiar with what each command does, you can just press the first letter of the command. To use the same example, loading a file, press the F1 function key, press "D" for "Document," press "L" for "Load," and then enter the document name or press the space bar for the directory.

Whenever this process becomes too complicated, you can use a two-keypress sequence. But you don't need to memorize (or write down on a handy scrap of paper that's never around when you need it) the key sequence programmed by *SuperScript*'s creators, because they left selection of the sequence up to you! Remember, *SuperScript* is programmable. You can program any text, function, or series of functions you want to any of the keyboard keys. You might choose to program the "l" key as the file load key. (That's lowercase "l." Uppercase "L" can be programmed with a different function, if you wish.) This is a simple process (also accessed by using the menus), and once done, all you need do to load a file is press the ESC or RUN/STOP key (RUN/STOP key only on the Commodore 64 version) followed by the "l" key. All the steps *SuperScript* goes through to load a document flash by on your monitor, until you are at the point where you must enter the file name.

DEFAULTS File

It's great to be able to program keys to suit your own purposes, but it sure would be a royal pain to do this at the beginning of every editing session. That's not necessary, because *SuperScript* puts a file on your data disk called DEFAULTS. This file can be edited just like any text file, and contains the default settings for margins and page layout. You can also put programs for any number of keys in the DEFAULTS file, and resave the file on your disk. The next time you load *SuperScript*, your DEFAULTS file is read and your own commands are immediately available at the touch of a key or two.

The DEFAULTS file also links to a printer file, which you can choose when your data disk is being created. The printer file tells *SuperScript* what your printer needs to know to do underlining, enhanced printing, condensed printing, double strike, italics, and any other special modes it is capable of employing. During writing and editing you use the menus (or your programmed keys) to put printer codes in the text. These codes are the same for all printers, and your printer file tells *SuperScript* which ASCII codes to actually send out to your printer/interface.

My major problem in using *SuperScript* was setting up the proper printer file. Unless you have one of the exact printers for which printer files already exist, as well as a "transparent" interface, you may have a bit of difficulty in setting one up. I use a Panasonic printer, which uses similar printer codes to Epson printers. Since Panasonic is not one of the choices, I chose Epson. However, I got strange results. After becoming more familiar with *SuperScript*, I loaded the Epson printer file, edited the proper Panasonic commands into it, and stored it under the name Panasonic. Now, all the printer commands work properly.

The parts of the printer file that gave me the most trouble had to do with how the codes were sent. My interface can be set up to be transparent by selection of the proper secondary address. A transparent interface doesn't bother the codes going to the printer, but it doesn't change them from Commodore ASCII to true ASCII, either. So I had to code my printer file to send true ASCII codes rather than CBM codes. A little experimentation with printer files helped.

Since most printer/interface combinations are set to totally emulate a Commodore printer (such as 1525 or MPS-801), selecting "cbm dot matrix" as your printer type will usually work. This way, you can get started printing from *SuperScript*, even if you can't immediately access all of your printer's special features.

Features Galore

SuperScript is loaded with features. The colors used for any of six areas of the screen can be changed by putting the proper command in the DE-

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FAULTS file. Editing can be done in any width from the width of your screen (40 or 80 columns) to 240 columns. The Commodore 64 version gives you 500 lines of 40-column editing space. You can write and edit in the same mode. You can move around the document using the cursor controls, control codes to move by word or paragraph, or the GO menu to go to a certain place (line number, top, bottom, etc.)

Editing can be done in either the Insert mode, where any character you type in the middle of the text pushes all other text to the right, or Overstrike mode, where typed characters overlay (replace) the previous characters. You can edit with wordwrap either ON or OFF. If wordwrap is ON, words are not split at the ends of lines as they are in *EasyScript*, which makes for easier reading. With wordwrap OFF words are split, but tables are easier to line up. You can toggle between these modes as often as you like, and the CONTROL-X key sequence will reformat your entire text to match the current setting.

The ERASE menu includes the ability to delete a character, word, sentence, paragraph, line, rest of the line, rest of document, all of document, or a block that you define with the cursor. The tab menu allows you to set and clear normal and decimal tabs. The CALC menu permits you to use a five-function calculator independent of your document (when your spouse asks you to balance the checkbook in the middle of firing off a letter to the editor), as well as adding up rows and columns of numbers in your document. A double menu of features allows easy access to your printer's special features, freeing you from remembering the proper codes to underline, italicize, enhance, double print, etc. Formatting your document for printing is easily accomplished from the LAYOUT menu, where margins, comments, headers and footers (up to two lines each with automatic page numbering starting with a number you can specify), centering and justification can be accessed.

The SET menu will toggle Insert mode and wordwrap, as well as providing access to file linking and the powerful search menu. A search can be made for any word or phrase, either by exact match or ignoring upper/lower case differences, either forward or backward in the document. A search-and-replace feature permits substituting some or all occurrences of a phrase with another phrase.

The AREA menu handles all of the cut/paste options. A block of text can be identified, then copied or moved to another part of the document. The Table command in the AREA menu allows you to move columns of a table left or right, up or down. By defining a block using the AREA menu, the DOCUMENT menu will allow you to save that block as a specific file on disk, making it easy to file and retrieve standard paragraphs. Besides supporting loading, saving, and replacing of files, the DOCUMENT menu provides disk directories and utilities, as well as supporting the appending of information to an existing file on disk. You can build a file of standard paragraphs (boilerplate) right on the disk without ever having loaded it into memory!

The spelling checker included with the *SuperScript* package is also accessed from the DOCUMENT menu, and is a breeze to use. The document in memory is checked, and words not found in the dictionary are highlighted, one at a time, in alphabetical order (not the order they appear in the document). You can accept the word the way it is, ignore it, change it, or add it to the dictionary. It's extremely fast in operation and quite simple to use, especially compared to spelling checkers which must be loaded separately.

Finally, we come to the PRINT menu, which of course lets you print your document. This menu also permits you to view your document on the screen, exactly as it will appear on paper. If you are using a 40-column screen and you have your printout margins set at columns 5 and 75, you use the cursor controls to slide your 40-column viewing window over the document. In this way, you can see the exact layout of your final output before one dot of ink is committed to paper.

The print menu also supports linking files (giving you a theoretically unlimited document length if you're willing to swap disks), mail merge, printing from a specific page number, output to disk, and printing only the odd or even pages.

Extra Features for the 128

As if all this isn't enough, *SuperScript* for the Commodore 128 has extra features. First of all, you have your choice of working in either 40 or 80 columns. You can switch between the 40/80 modes at any time, but you must be careful to save your text, since switching modes erases the memory. The text area size is larger on the 128 (999 lines in 40-column mode and 726 lines in 80-column mode). And *SuperScript* for the 128 makes use of all the keys on the 128 keyboard, including ESC, CAPS LOCK, and the numeric keypad.

Perhaps the most interesting feature of *SuperScript 128* above and beyond *SuperScript 64* is that the 128 version contains not one, but two separate text areas. This second area is 509 lines long in 40-column mode, and 254 lines in 80-column mode. You can use the second text area to store unused paragraphs, or even edit two separate documents concurrently. The second text area is also used to load *SuperBase 128*, which can reside in memory at the same time as *SuperScript 128*! The combination of these two "Super" programs makes a really powerful integrated package for your Commodore 128.

Final Analysis

In his "Buyer's Guide to Word Processors" in the November/December 1985 issue of *Commodore Microcomputers*, Donald Maxwell created a table of word processor features. He divided the features into three groups: Standard Features Every Word Processor Should Have; Extra Features of Full Featured Word Processors; and Fancy Stuff Found in Only a Few Word Processors. Let's see how *SuperScript* compares.

SuperScript has all the Standard Features. In the Extra Features section, the only place where *SuperScript* is lacking is that it will not automatically prevent what are known as widows and orphans—a single line of a paragraph appearing at the very bottom or very top of a page. You can, however, correct this yourself while previewing your document. On the third list, Fancy Stuff, *Super-*

REVIEWED BY HOWARD MILLMAN

Script does pretty well, but the "deficiencies" deserve some comment.

SuperScript has no delete buffer. Once you delete text, it's gone. It also won't alphabetize lists, except that the spelling checker will produce an alphabetized list of all the unique words in your text, along with the number of times they're used. *SuperScript* will allow 80-column typing and editing, although this is extremely inconvenient to use on a 40-column screen. The recommended method is to type, edit, and spell-check in 40-column mode, then preview the final format in 80 columns. *SuperScript* does not provide for key-clicks, but it does beep at you on errors and when your attention is needed in cases where you could inadvertently delete your text.

SuperScript will not print from cursor location, nor does it provide alternate character sets. It will allow you to access your printer's alternate character sets, if they exist. Double-column printing is not directly supported, but by careful use of margins and the column move feature, you can get a double-column output.

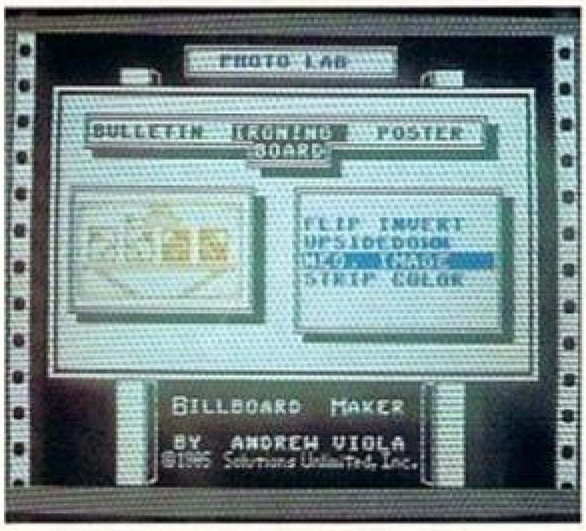
SuperScript will not change text file types between SEQ and PRG, but it will pick up *EasyScript* files with a minimum of changes. The text does not appear on screen while loading, and *SuperScript* works only with disk, not cassette tape. It employs no fast-loading techniques other than the auto-booting on the 128 and quicker loading on the 1571 disk drive.

All in all, these "deficiencies" are extremely minor when you consider the overall power and flexibility of this program. In my opinion, it is better than the word processing capability of Symphony on the IBM PC, operates visibly faster (except for disk access), and costs a mere fraction of the price. *SuperScript* is a fantastic word processor for anyone who already has hands-on experience with word processing.

In the printing field, a subscript is a notation that goes a bit below the normal line of text, and a superscript is text that is on a higher level than the rest. *SuperScript*, the word processor for the Commodore 128 and Commodore 64, lives up to its name: It exists on a higher level than those around it. ◼

Billboard Maker

Computer: Commodore 64
Publisher: Solutions Unlimited
P.O. Box 177
Dobbs Ferry, NY 10522
Medium: Disk
Price: $44.00



Billboard Maker enlarges graphics imported from other programs to up to two-and-a-half by four feet.

Rather than competing with established graphics programs, *Billboard Maker* wisely opted to enrich them. In this program, graphics are first imported from other popular graphics programs like *Doodle, Koala, ComputerEyes,* and *Blazing Paddles,* then enlarged—offering printouts up to two-and-a-half by four feet!

The program is divided into three main rooms: Photo Lab, Typesetter, and Printing Press. Traveling through each room is quick. With the exception of frame choice and font, the entire program is resident in memory.

The manual and menus are tutorial, walking you through each room and introducing its options. Room options include selecting from four frame overlays, three fonts, three printout sizes (standard, sign and mural), inverting (for ironing on tee shirts), and negative image (white on black) printing. The cursor moves you to the option of your choice. Future font/symbol disks as well as frame choices are in the works.

Billboard Maker offers extensive flexibility in designing the finished layout. For instance, micro adjustments allow your picture or text to be cropped or shifted within the frame. Another of the program's merits is the "Optimizer." After a graphic is blown up to exaggerated proportions, the image becomes noticeably grainy. To fill in the spaces, toggle the Optimizer to avoid pimply printouts.

Messages are composed over the background graphic by transferring the type from a "font" to a "layout" plate, one letter at a time. After choosing the typeface (font), you're presented with a full screen of alpha/numeric characters in that font. Pick a letter or symbol by enclosing it within movable brackets, press RETURN, and you are at the layout plate. Using the cursor keys, move the letter to its location and again press RETURN. Any copy can be saved on a separate working disk, so your creative efforts can be preserved.

Printing is straightforward, consisting of simple menu choices followed by a lot of patience while your printer churns out the copy. Sign and mural-size graphics are printed on linked strips requiring you to match and attach them afterwards. You have the choice of printing all or only selected strips. Obviously, a program like this can make a printer old before its time. Proper precautions to avoid printer overheating are sprinkled throughout the manual. Heed them.

The program disk uses a full 245 blocks, leaving only 11 free. It loads in just 45 seconds with Epyx's *Fast Load;* without, it takes about two and a half minutes.

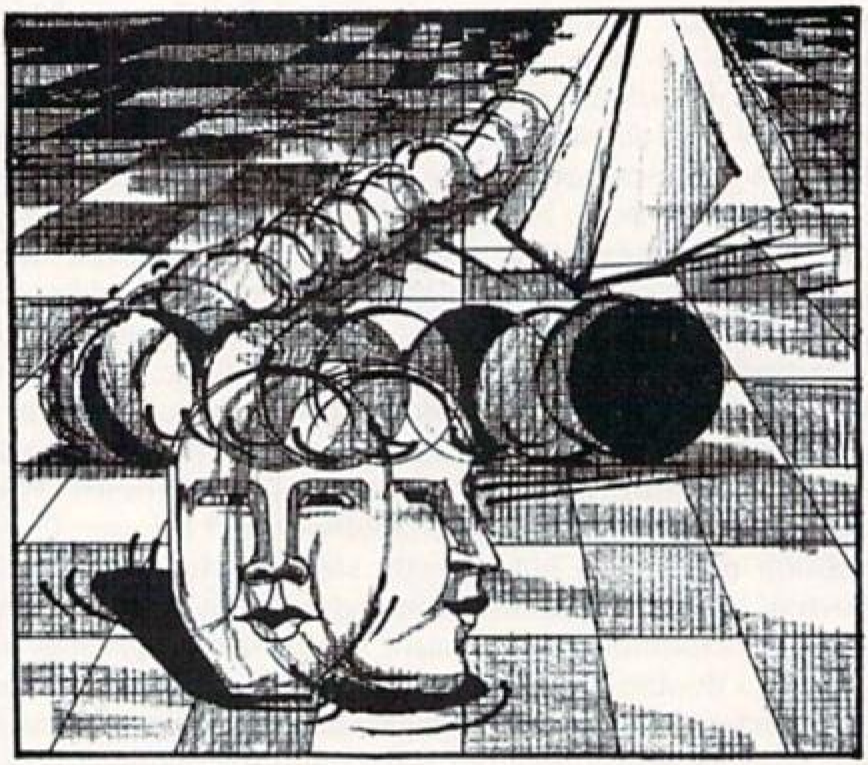
Billboard Maker is well crafted and easy to use, especially considering its size and versatility. It's a perfect complement to the limited text-handling and printout options of popular graphics programs. ◼

BY DEAN S. ROSSA

Rotate Sprites

for the Commodore 64

This little program automatically recalculates sprite data so you can rotate a sprite without having to redesign it.



Have you ever wanted to rotate a sprite through 90 degrees or flip it around a horizontal or vertical axis, but did not do so because of the work involved in redesigning the sprite? The accompanying program uses one set of sprite data, translates it back into binary if necessary, and calculates new data to make your sprite do an about-face, make a right turn, or stand on its head.

Options 1 and 2 in the program rotate the sprite 180 degrees around a vertical or horizontal axis, respectively, by switching data within the 21 rows and 24 columns of the original sprite grid. Option 1 switches from leftmost columns to rightmost columns and option 2 from topmost rows to bottommost rows. Both rotations could be achieved by doing two 90-degree rotations, but the 90-degree rotations are slower.

The code for the 90-degree rotation adjusts for the fact that the 24-by-21 sprite grid is not a perfect square. The data in the 21 rows of the original sprite is read into 21 columns for the new sprite. Program option 3 duplicates three of the columns within the old sprite at regular intervals in the new one. Program option 4 transfers the 21 old rows into 21 columns and leaves columns 22, 23, and 24 of the new sprite blank.

The fact that the 24 columns from the old sprite will not fit neatly into 21 rows of the new is also dealt with in two ways. Option 4 in the program deletes the three rightmost columns. Choose that option if those columns were blank in the old sprite. Option 3 drops every eighth column from the old sprite so that data is not lost off the right of the old.

Replace the data at the end of the program with your own data and find the best option for your sprite.

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Sprite Rotate

```
10 FOR I=53289 TO 53293:POKE I,0
   :NEXT'FQXD
20 POKE 53269,0:PRINT"[CLEAR]
   THIS PROGRAM TAKES DATA FOR 1
   SPRITE"'CISL
30 PRINT"[SPACE6]AND CALCULATES NEW
   DATA"'BAHG
40 PRINT"TO PUT SPRITE IN DIFFERENT
   POSITIONS.":PRINT'CBTL
50 PRINT:PRINT"TO USE ON YOUR DATA"
   :PRINT"REPLACE DATA AT END OF
   PROGRAM"'DCAQ
60 PRINT"[SPACE6]WITH YOUR OWN DATA"
   :PRINT'CBBJ
70 PRINT"HIT A KEY TO CONTINUE":PRINT
   :PRINT"THE SPRITE WILL APPEAR AT
   LEFT"'DCJT
80 GET K$:IF K$=""THEN 80'EHFI
90 BY=21:DIM B(21,3),F(21,21),U(21,3),
    A(24,24) ,RO(24,3),SP(75),
   SP$(75)'CMBS
100 V=53248:J=0:FOR I=1 TO BY
    :FOR K=1 TO 3'ISOE
110 READ B(I,K):SP(J)=B(I,K):J=J+1
    :NEXT :NEXT :GOSUB 430'HDKG
120 PRINT"[CLEAR,DOWN3,RVS]1[RVOFF]
     TO FLIP RIGHT TO LEFT"'BACF
130 PRINT"[RVS]2[RVOFF]
     TO FLIP UP TO DOWN[SPACE3]"'BAEE
140 PRINT"[SPACE4]TO ROTATE 90
    DEGREES "'BAGF
150 PRINT"[RVS]3[RVOFF]
     SPREAD DATA EVENLY OVER ROW &
    COLUMNS"'BABL
160 PRINT"[RVS]4[RVOFF]
     STRIP DATA FROM RIGHT OF
    SPRITE"'BAXL
170 IF SB>4 THEN STOP'EDJF
180 GET K$:IF K$=""THEN 180'EIDH
190 IF ASC(K$)<49 OR ASC(K$)>52 THEN
    180'HPPL
200 PRINT"[CLEAR]":B=VAL(K$)
    :TI$="000000":ON B GOTO 210,270,
    300,300'GCFH
210 FOR I=1 TO BY:FOR K=1 TO 3
    : S=B(I,K)'HQLF
220 FOR P=7 TO 0 STEP -1
    :PRINT"[HOME,DOWN3]"TI$'GILD
```

```
230 IF 2^P=<S THEN F(I,4-K)=F(I,
    4-K)+2^(7-P): S=S-2^P'OCCO
240 NEXT :NEXT:NEXT'DCYB
250 J=0: FOR I=1 TO BY:FOR K=1 TO 3
    :SP(J)=F(I,K):J=J+1:NEXT:NEXT'MEBP
260 GOSUB 430:GOTO 120'CHVE
270 J=0: FOR I=1 TO BY:PRINT"[HOME,
    DOWN3]"TI$:  FOR K=1 TO 3'IPKL
280 U(I,K)=B(BY+1-I,K):SP(J)=U(I,
    K)'ECCN
290 J=J+1:NEXT :NEXT:GOSUB 430
    : GOTO 120'GNBL
300 Q=BY: FOR I=BY TO 1 STEP-1
    :PRINT"[HOME,DOWN3]"TI$
    :FOR K=1 TO 3:S=B(I,K)'LAQK
310 FOR P=7 TO 0 STEP-1
    :  A((K-1)*8+8-P,BY+1-Q)=0'MVBK
320 IF 2^P<=S THEN A((K-1)*8+8-P,
    BY+1-Q)=1:S=S-2^P'PYKO
330 NEXT P: NEXT K :IF B=4 THEN
    360'FJGF
340 IF I/7<>INT(I/7)THEN 360'HJRH
350 Q=Q-1:FOR T=1 TO 24
    :A(T,BY+1-Q)=A(T,BY-Q):NEXT T'KDJF
360 Q=Q-1: NEXT I'DFCG
370 J=0:Q=1:  FOR R=1 TO 21'FKTJ
380 IF B=3 AND R/7=INT(R/7)THEN
    Q=Q+1'KLPO
390 FOR C=1 TO 3:RO(R,C)=0
    :FOR P=7 TO 0 STEP-1'JRDP
400 IF A(Q,(C-1)*8+8-P)=1 THEN RO(R,
    C)=RO(R,C)+2^P'KEUL
410 NEXT P:SP(J)=RO(R,C):J=J+1'ESKG
420 NEXT C:Q=Q+1:NEXT R: GOSUB 430
    :GOTO 120'GPOG
430 PRINT"[CLEAR]":  SB=SB+1
    :PW=PW+2^(SB):POKE V+21,PW
    :POKE 2040+SB,220+SB'LLNR
440 FOR N=0 TO 62:POKE 14080+64*SB+N,
    SP(N):NEXT'IWCM
450 PRINT"[CLEAR]":POKE V+(SB*2),40*SB
    :POKE V+(SB*2+1),50'JXWO
460 PRINT"[HOME,DOWN3]ENTER [RVS]Y
    [RVOFF] TO SEE DATA"'BAGK
470 GET K$:IF K$=""THEN 470'EIFJ
480 IF K$<>"Y"THEN 530'EFVJ
490 FOR N=0 TO 62 STEP 9
    :FOR M=0 TO 8 :SP$(N+M)=STR$(SP
    (N+M))'LABT
500 PRINT TAB(4*M);SP$(N+M);:NEXT
    :PRINT: NEXT'HPAG
510 PRINT:PRINT"HIT ANY KEY TO
    CONTINUE"'CBNH
520 GET K$:IF K$=""THEN 520'EIBF
530 PRINT"[CLEAR]":  RETURN'CBTD
540 DATA 0,0,0,0,0,0,0,0,0,0,0,0,16,0,
    0,60,0,0,126,0,0'BUJL
550 DATA 239,0,0,135,255,224,7,255,
    240,3,255,252,3,255,247,1,254,
    227'BJVP
560 DATA 1,249,230,1,225,96,1,34,96,1,
    36,224 ,1,242,128,0,8,128,0,0,0,0,
    0,0'BPMR
```

END

BY HOWARD MILLMAN

QuantumLink Capsules

Skeptical of shrink-wrapped promises in packaged programs? Here's one solution— try it before you buy it on the QuantumLink telecommunications network.

Before you buy selected software packages, you may want to try them out in demo form using QuantumLink's Software Previews section. This service is so advanced it's simple. Here's how it's done.

After you log onto QLink, go to the Commodore Software Showcase and choose Software Previews. You're offered a choice of about 30 programs in three categories (entertainment, education, and enrichment) from over 20 manufacturers.

Scan the list, select one, and read the brief description of the program. The Preview menu also contains a comment section, so check this for prior users' comments and evaluations of the program. Still interested? O.K., let's download it.

Have a formatted disk available. It doesn't have to be newly formatted, but make sure you have enough room left to capture the downloaded program. The size of the program is stated in kilobytes (one of Commodore's disk blocks holds about 256 bytes), along with the downloading time at both 300 and 1200 baud.

Just follow the simple prompts to begin downloading. Once it's underway, messages flash on-screen, keeping you informed of the download's progress.

The downloading is completely automatic. QLink's system does all the work, including error checking, and declaring when all is done. Afterward, simply type in LOAD "Program Name",8,1 and that's it. If you should forget the name, just list your disk's directory.

Understand that you receive a representative module of the software—a sample—not the whole program. But the module runs independently, since it's actually a complete mini program.

Avoid disappointment or gambling with your software dollars by previewing the program first. Then, if you're satisfied—buy it. Ordering instructions are included on QLink. Sometimes a bonus discount is offered if you mention seeing it on the QLink network.

Speaking of cost, QLink's on-line charges are relatively low. The basic fee is $9.95 a month, which gives you access to many of the services. Additional services are available for a low connect-time charge of six cents a minute.

QuantumLink is the only Commodore-specific telecommunications network presently available. For information concerning its complete services, contact Quantum Computer Services, 800-392-8200. ■

BY MARK ROBIN

Fast Sprites

for the Commodore 64

This utility lets BASIC programmers move sprites 16 times faster than normal without using any PEEKs or POKEs.

The "Fast Sprite" program at the end of this article provides 128 new commands for moving sprites in your programs. The syntax is:

asterisk sprite# direction

There are 16 possible directions for a sprite to move, labeled A through P, as shown in Figure 1. So the command "*1A," for example, would move sprite #1 up one position.

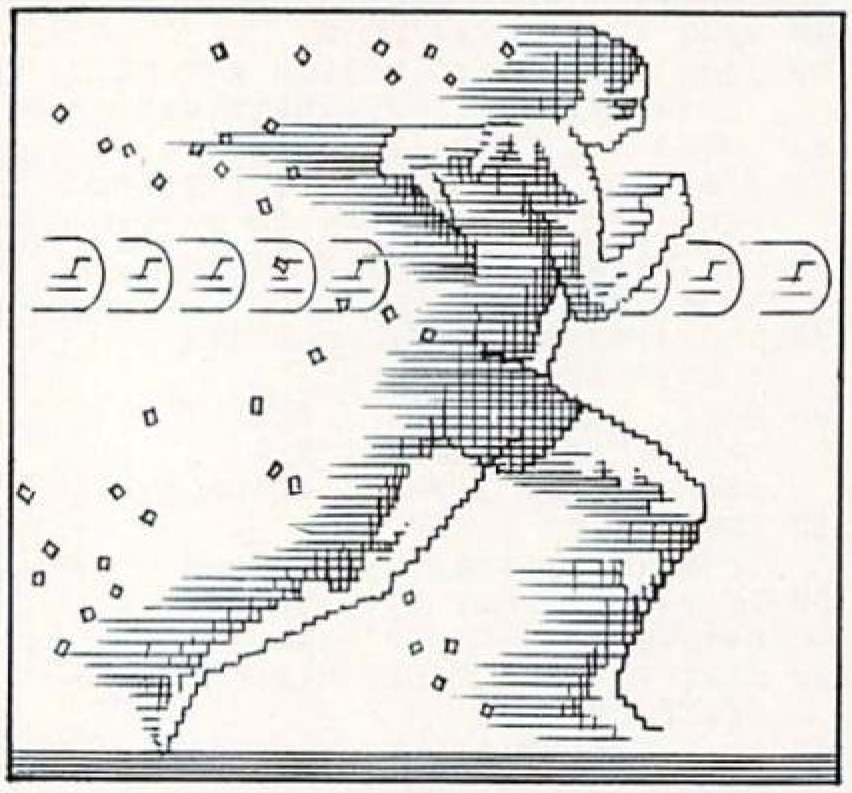
You can also use more than one command in a row, like this:

*1A*2E*3F*4A

In an IF-THEN statement, a colon must be used after THEN, like this:

IF A = 5 THEN:*1A

This command would move sprite #1 up if the variable A were equal to five. ■



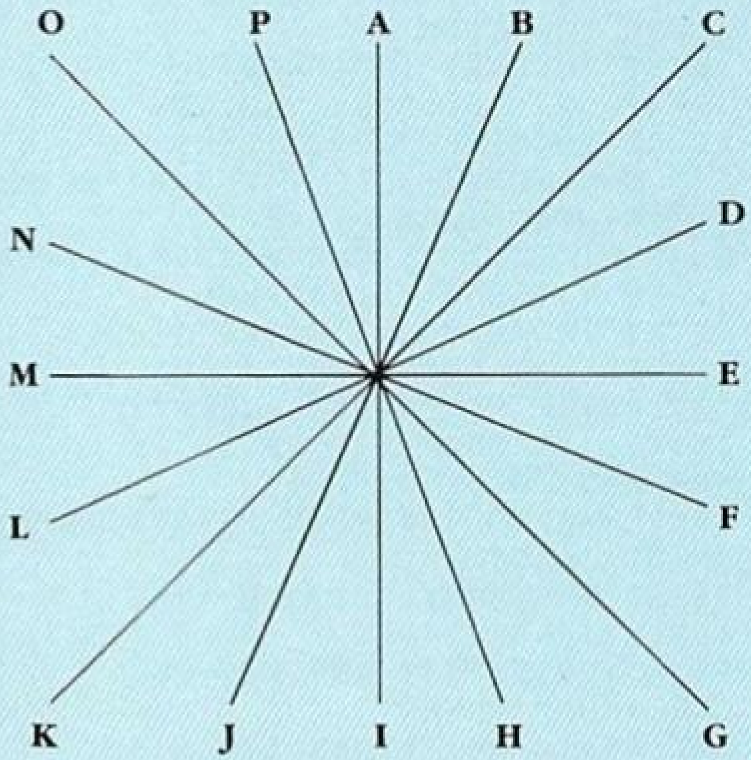
Move sprites 16 times faster than normal without using any PEEKs or POKEs.

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Fast Sprites

```
1 PRINT "[CLEAR]POKING-";'BBYC
5 S=49152:E=49520'CNMH
6 FOR P=S TO E'DDPG
10 READ A$'BCKW
20 L=ASC(MID$(A$,2,1)):T=T+L'FPRE
30 H=ASC(MID$(A$,1,1)):T=T+H'FPIF
40 L=L-48:IF L>9 THEN L=L-7'HKVH
50 H=H-48:IF H>9 THEN H=H-7'HKBI
55 B=H*16+L:IF B>=0 AND B<256 THEN
   60'JOTP
56 IF E=49520 THEN PRINT"ERROR IN
   LINE"INT((P-S)/8)+1000:END'JSJU
57 PRINT"ERROR IN LINE"INT((P-S)/8)
   +1047:END'GMFR
60 PRINT"[HOME,RIGHT12]"P;'BCVE
70 POKE P,B:NEXT'CERF
80 IF E=49520 THEN S=12288:E=12350
   :GOTO 6'GVQM
90 IF T<>48197 THEN PRINT"ERROR IN
   DATA":STOP'GHXN
95 PRINT"OK DONE"'BABM
97 PRINT"PRESS SPACE TO SEE DEMO OR
   [BACK ARROW] TO END"'BADV
98 GET A$:IF A$=""THEN 98'EHYQ
99 IF A$="[BACK ARROW]"THEN END'ECPR
100 REM       EXAMPLE PROGRAM'BODY
110 POKE 53269,255: REM ENABLE ALL
    SPRITES'CBSD
120 FOR I=2040 TO 2047:POKE I,192:NEXT
    :  REM DATA FROM BLOCK 192'GIKI
130 FOR I=53287 TO 53294:POKE I,1:NEXT
    :  REM SPRITES WHITE'GEOI
132 POKE 53281,0: REM SCREEN
    BLACK'CTTF
135 SYS 49152: REM ENABLE
    FAST/SPRITE'CXUK
136 T=TI'BDMF
137 FOR I=1 TO 1000'DGSI
140 *0A*1B*2C*3D*4E*5F*6G*7H'IQGI
```

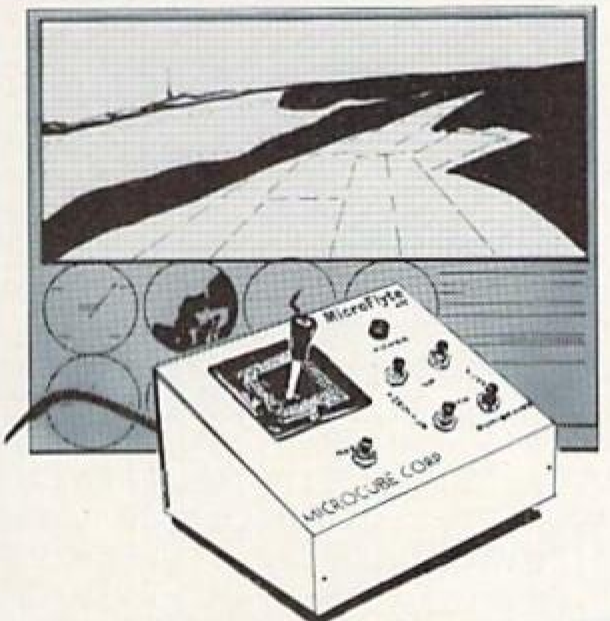
Figure 1. Direction Labels



JIFFIES/FAST SPRITES

```
150 NEXT'BAEA
160 PRINT"[CLEAR,WHITE]
    TIME -"TI-T'CDDF
1000 DATA A2,C7,A0,C0,8E,08,03,8C'BXYX
1001 DATA 09,03,60,A9,E4,8D,08,03'BXJY
1002 DATA A9,A7,8D,09,03,60,05,C1'BXWA
1003 DATA 08,C1,11,C1,17,C1,20,C1'BXBB
1004 DATA 23,C1,2C,C1,32,C1,3B,C1'BXIC
1005 DATA 3E,C1,47,C1,4D,C1,56,C1'BXBD
1006 DATA 59,C1,62,C1,68,C1,00,00'BXXE
1007 DATA 01,00,02,00,04,00,08,00'BXWE
1008 DATA 10,00,20,00,40,00,80,FE'BXPF
1009 DATA 00,FD,00,FB,00,F7,00,EF'BXFH
1010 DATA 00,DF,00,BF,00,7F,AD,10'BXAY
1011 DATA D0,3D,38,C0,D0,1A,DE,00'BXDA
1012 DATA D0,BD,00,D0,C9,FF,F0,01'BXYB
1013 DATA 60,A9,57,9D,00,D0,AD,10'BXHC
1014 DATA D0,1D,38,C0,8D,10,D0,60'BXCD
1015 DATA DE,00,D0,BD,00,D0,C9,FF'BXRE
1016 DATA F0,01,60,AD,10,D0,3D,47'BXWF
1017 DATA C0,8D,10,D0,60,FE,01,D0'BXOG
1018 DATA 60,AD,10,D0,3D,38,C0,D0'BXNH
1019 DATA 10,FE,00,D0,F0,01,60,AD'BXGI
1020 DATA 10,D0,1D,38,C0,8D,10,D0'BXWA
1021 DATA 60,FE,00,D0,BD,00,D0,C9'BXGB
1022 DATA 58,F0,01,60,A9,01,9D,00'BXZC
1023 DATA D0,AD,10,D0,3D,47,C0,8D'BXKD
1024 DATA 10,D0,60,DE,01,D0,60,20'BXYE
1025 DATA 73,00,08,C9,AC,F0,04,28'BXTF
1026 DATA 4C,E7,A7,28,20,73,00,38'BXJG
1027 DATA E9,30,30,F4,C9,08,10,F0'BXWH
1028 DATA 0A,AA,20,73,00,38,E9,41'BXKI
1029 DATA 30,E6,C9,51,10,E2,0A,A8'BXGJ
1030 DATA B9,16,C0,8D,36,C0,B9,17'BXUB
1031 DATA C0,8D,37,C0,20,02,C1,4C'BXYC
1032 DATA C7,C0,6C,36,C0,4C,C3,C0'BXND
1033 DATA 20,C3,C0,20,91,C0,4C,C3'BXUE
1034 DATA C0,20,C3,C0,4C,91,C0,20'BXRF
1035 DATA 91,C0,20,C3,C0,20,91,C0'BXEG
1036 DATA 4C,91,C0,20,91,C0,20,8D'BXOH
1037 DATA C0,4C,91,C0,20,91,C0,4C'BXBI
1038 DATA 8D,C0,20,8D,C0,20,91,C0'BXDJ
1039 DATA 4C,8D,C0,4C,8D,C0,20,8D'BXVK
1040 DATA C0,20,56,C0,4C,8D,C0,20'BXYC
1041 DATA 56,C0,4C,8D,C0,20,56,C0'BXID
1042 DATA 20,8D,C0,4C,56,C0,4C,56'BXME
1043 DATA C0,20,56,C0,20,C3,C0,4C'BXSF
1044 DATA 56,C0,20,56,C0,4C,C3,C0'BXCG
1045 DATA 20,C3,C0,20,56,C0,4C,C3'BXVH
1046 DATA C0,00,7F,00,01,FF,C0,03'BXQI
1047 DATA FF,E0,03,E7,E0,07,D9,F0'BXBJ
1048 DATA 07,DF,F0,07,D9,F0,03,E7'BXLK
1049 DATA E0,03,FF,E0,03,FF,E0,02'BXKL
1050 DATA FF,A0,01,7F,40,01,3E,40'BXAD
1051 DATA 00,9C,80,00,9C,80,00,49'BXME
1052 DATA 00,00,49,00,00,3E,00,00'BXTE
1053 DATA 3E,00,00,3E,00,00,1C,00'BXAF
1054 DATA END'BDOD
```

END



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BY MARK ROBIN

Variable Saver

for the Commodore 64

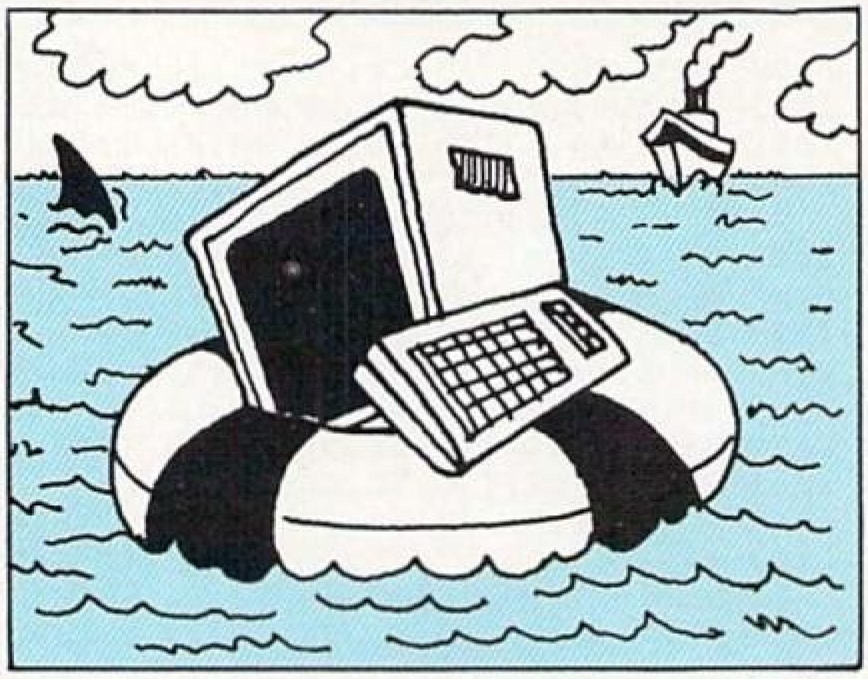
This is a short wedge program that can be used when you are trying to debug a program. When this wedge is running, all BASIC variables are automatically saved and restored. You can stop a program and then edit, delete or add code without losing your variable data. If you restart the program with a RUN command, all variables will be reset. If you restart with a GOTO command, however, the variables are restored and not reset.

If your program uses a lot of string space during execution, type the following line before beginning to edit.

PRINT FRE(0)

Strings which appear in your program in the form A$ = "HELLO" should be changed to the form A$ = HELLO" + " " if you want them saved.

To enable the variable saver wedge, type SYS 49152. To disable the wedge, type SYS 49193.



Stop a program in order to edit it, without losing your variable data.

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Variable Saver BASIC Loader

```
10 PRINT "[CLEAR]POKING-";'BBYA
20 P=49152 :REM $C000'CMXB
30 READ A$:IF A$="END"THEN 95'EHHD
40 L=ASC(MID$(A$,2,1))'DLEE
50 H=ASC(MID$(A$,1,1))'DLYF
51 TH=TH+H:TL=TL+L'ELDH
60 L=L-48:IF L>9 THEN L=L-7'HKVJ
70 H=H-48:IF H>9 THEN H=H-7'HKBK
75 B=H*16+L:IF B<0 OR B>255 THEN
   PRINT"ERROR IN";INT((P-49152)/8)
   *10+100:END'PFKB
80 PRINT"[HOME,RIGHT12]"P;'BCVG
90 POKE P,B:P=P+1:GOTO 30'EKAJ
95 IF TH=24106 AND TL=23153 THEN
   PRINT"DATA OK":STOP'HPJT
96 PRINT"ERROR IN DATA ":STOP'CBJQ
100 DATA 18,A5,14,69,34,85,77,A5'BXIA
110 DATA 15,69,00,85,78,A9,EA,85'BXCB
120 DATA 73,85,74,85,75,A9,4C,85'BXWC
130 DATA 76,60,00,00,00,00,00,00'BXBC
140 DATA 00,00,00,00,00,00,00,00'BXHD
150 DATA 00,A2,05,BD,A2,E3,95,73'BXFF
160 DATA CA,10,F8,60,E6,7A,D0,02'BXWG
170 DATA E6,7B,A5,9D,D0,0E,4C,79'BXJH
180 DATA 00,AD,24,C0,F0,F8,20,ED'BXII
190 DATA C0,4C,3E,C0,A5,7A,D0,EE'BXTJ
200 DATA 20,79,00,C9,52,D0,08,A9'BXIB
210 DATA 00,8D,24,C0,4C,3E,C0,C9'BXXC
220 DATA 89,D0,07,A9,00,85,9D,4C'BXLD
230 DATA 57,C0,C9,30,30,D3,C9,3A'BXME
240 DATA 10,CF,98,48,8A,48,AD,24'BXCF
250 DATA C0,F0,03,20,ED,C0,EE,24'BXFG
260 DATA C0,A2,07,B5,2D,9D,1C,C0'BXJH
270 DATA CA,10,F8,A5,31,85,22,A5'BXII
280 DATA 32,85,23,A5,33,85,24,A5'BXTJ
290 DATA 34,85,25,20,DA,C0,A9,00'BXMK
300 DATA 8D,27,C0,8D,28,C0,A0,00'BXGC
310 DATA B1,22,91,24,20,D0,C0,38'BXSD
320 DATA A5,22,E5,2D,A5,23,E5,2E'BXBE
330 DATA B0,EE,A5,24,18,69,01,8D'BXRF
340 DATA 25,C0,A5,25,69,00,8D,26'BXHG
350 DATA C0,68,AA,68,A8,4C,3E,C0'BXXH
360 DATA C6,22,A5,22,C9,FF,D0,02'BXAI
370 DATA C6,23,C6,24,A5,24,C9,FF'BXMJ
380 DATA D0,02,C6,25,EE,27,C0,D0'BXUK
390 DATA 03,EE,28,C0,60,A5,2D,85'BXNL
400 DATA 22,A5,2E,85,23,AD,25,C0'BXGD
410 DATA 85,24,AD,26,C0,85,25,98'BXVE
420 DATA 48,8A,48,A0,00,B1,24,91'BXCF
430 DATA 22,E6,22,D0,02,E6,23,E6'BXRG
440 DATA 24,D0,02,E6,25,CE,27,C0'BXGH
450 DATA D0,EB,AD,28,C0,F0,05,CE'BXSI
460 DATA 28,C0,10,E1,A9,00,8D,24'BXNJ
470 DATA C0,AD,22,C0,85,33,AD,23'BXQK
480 DATA C0,85,34,38,A5,2D,ED,1C'BXGL
490 DATA C0,8D,1A,C0,A5,2E,ED,1D'BXRM
500 DATA C0,8D,1B,C0,90,26,18,AD'BXYE
510 DATA 1E,C0,6D,1A,C0,85,2F,AD'BXEF
520 DATA 1F,C0,6D,1B,C0,85,30,AD'BXKG
530 DATA 20,C0,6D,1A,C0,85,31,AD'BXOH
540 DATA 21,C0,6D,1B,C0,85,32,68'BXTI
550 DATA AA,68,A8,60,38,AD,1C,C0'BXRJ
560 DATA E5,2D,8D,1A,C0,AD,1D,C0'BXQK
570 DATA E5,2E,8D,1B,C0,38,AD,1E'BXLL
580 DATA C0,ED,1A,C0,85,2F,AD,1F'BXUM
590 DATA C0,ED,1B,C0,85,30,AD,20'BXEN
600 DATA C0,ED,1A,C0,85,31,AD,21'BXFF
610 DATA C0,ED,1B,C0,85,32,4C,67'BXDG
620 DATA C1,END'BGYD
```

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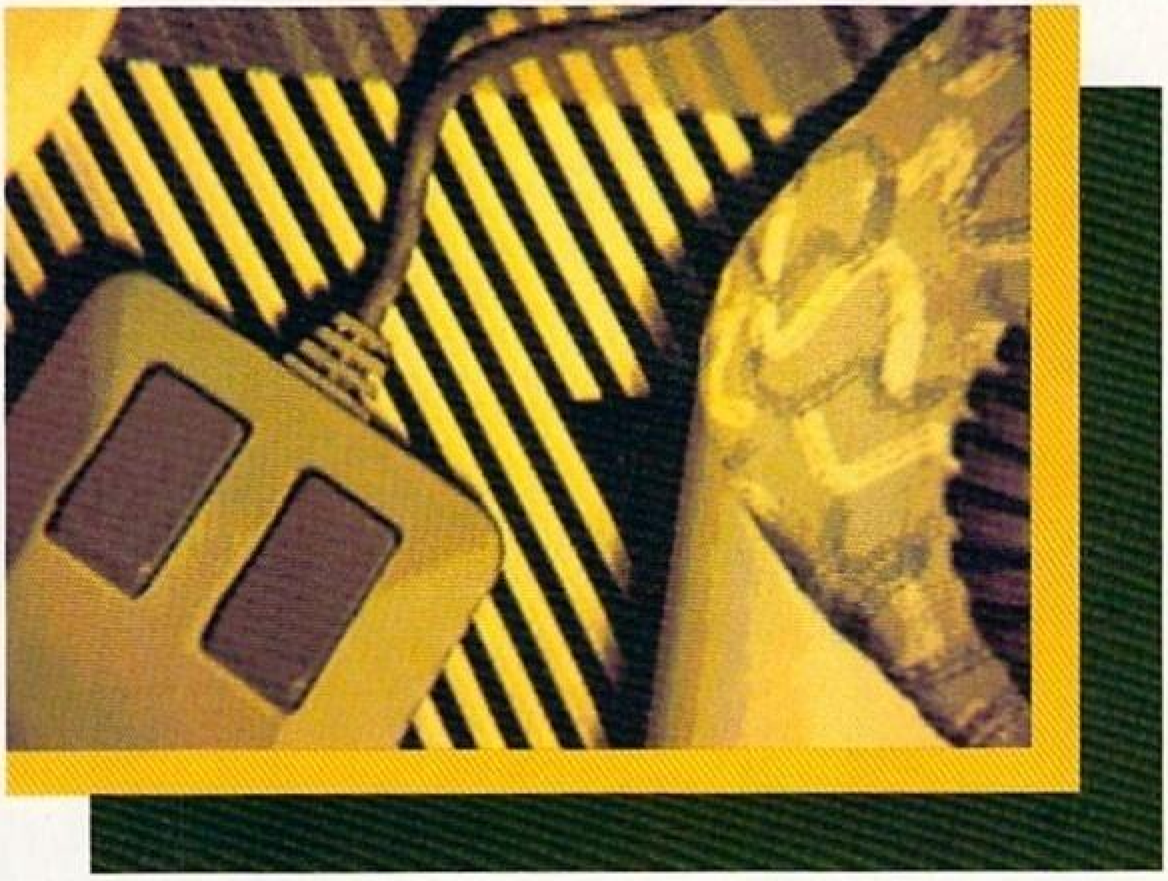

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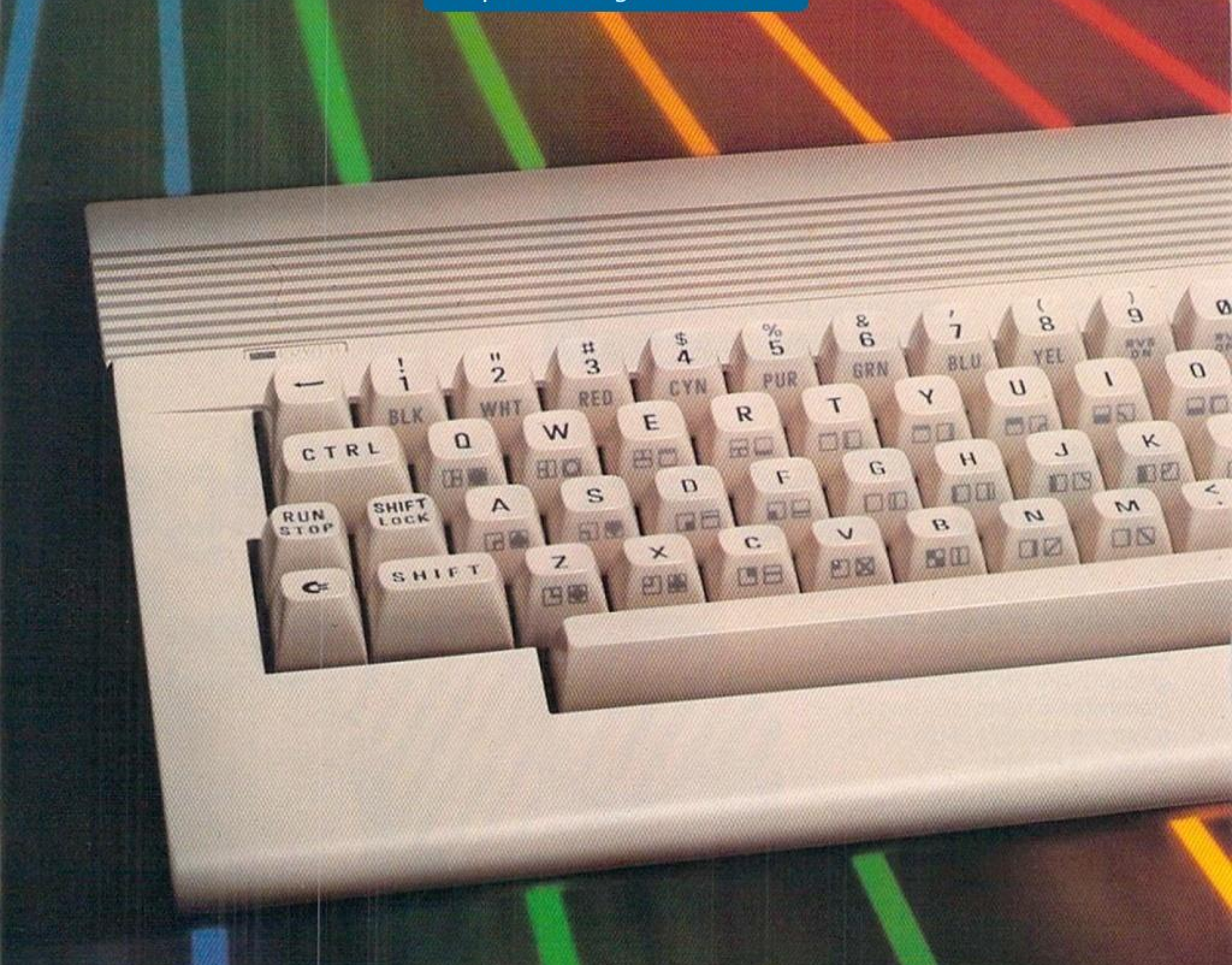


New Look 64C

We'd like to introduce you to the Commodore 64, 1986 style. It's called the Commodore 64C, it has an elegant new look, and it comes packaged with some great software. Internally, however, it's still the same computer we all know so well—the computer that so many of us grew up on—the old friend that brought computer literacy out of the engineering labs and data processing departments and into our homes. It's still a Commodore 64. The same logic board, the same keyboard, the same ports. So don't be fooled by that suave exterior.

But we've all become more sophisticated in our understanding of computers since the 64 was introduced four years ago. So Commodore thought it was time to give its best-selling computer a new look that better reflects what it really is—a sophisticated piece of equipment for a sophisticated user.

Not only that, but this '86 model comes packaged with *GEOS* software—a "desktop"-style operating system that lets you use icons and windows to run a word processor *(geoWrite)* and drawing system *(geoPaint)*, with more applications to come. (*GEOS* was previewed in the May/June *Commodore Microcomputers.*) In addition, Commodore is including QuantumLink telecommunications software and an educational package with the 64C.

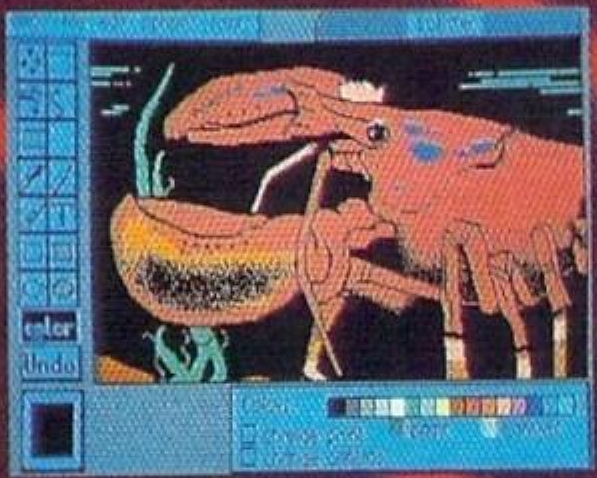
This contemporary 64 should begin appearing in stores within the next few months. Watch for it.

CLR HOME
INST DEL
RESTORE
RETURN
SHIFT
CRSR
f1 f2
f3 f4
f5 f6
f7 f8
commodore 64
PERSONAL COMPUTER

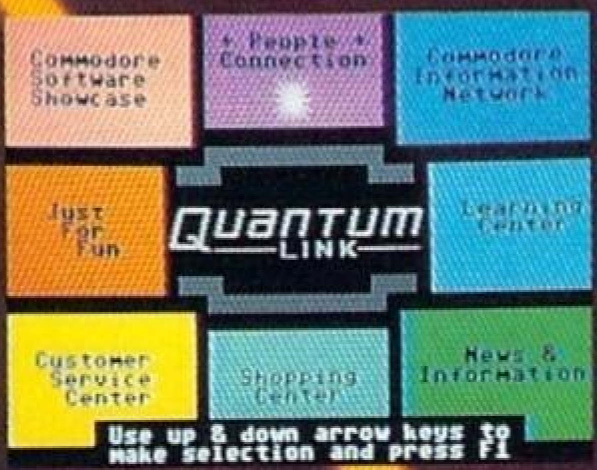
Commodore 64C: The computer we all grew up on has grown up.

Since the 64C is a Commodore 64 in sleek clothing, you'll find the two joysticks ports, on-off switch and power port in the same place.

If this looks like the back of a Commodore 64, you're right—and wrong—it's the back of it's elegant older sister, the 64C.



geoPaint software will be packaged with the 64C, as will *geoWrite*, a word processor.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Use up & down arrow keys to make selection and press F1

QuantumLink telecommunications software is part of the 64C package.

A mouse will be available for the 64C, to aid in controlling *GEOS*-based software.

SECRETS OF A COMPUTER ARTIST

Michael Kosaka, computer artist with Epyx, worked on the graphics for *Summer Games II* and *Rescue on Fractalus.*

BY KELLYN BEECK

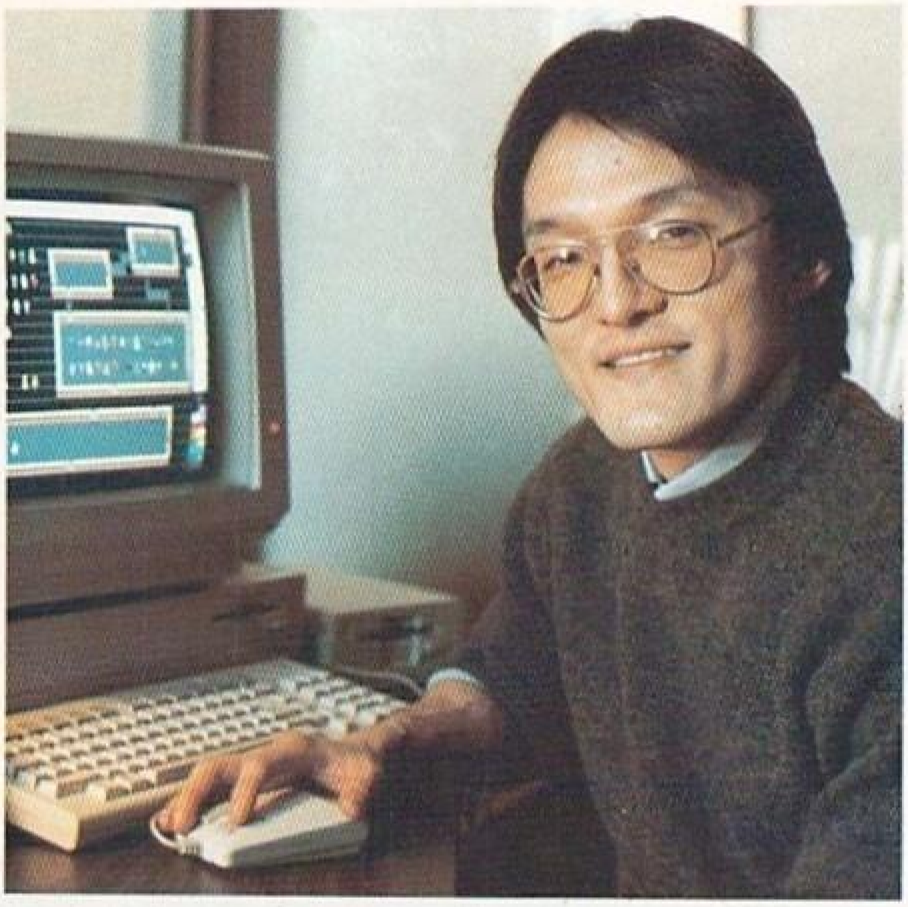
Every artist has a few secrets, and computer artists are no exceptions. They have invented dozens of personal tricks and techniques which they use with dazzling results. This how-to article is a chapter from a book in progress called **Creative Graphics: 101 Secrets from Computer Artists.**

Pac Man gave many Americans their introduction to computer games. For artist Michael Kosaka, it was *Pie Man.*

Kosaka, now a computer graphics animator at Epyx Incorporated, had a job installing burglar alarms in the San Francisco area in 1981 when a friend showed him a computer. "I was immediately intrigued by this wonderful machine," he says, "so my friend and I started working together and we wrote a game called *Pie Man.*"

Pie Man is now a resident of the Smithsonian Institution. Penguin Software published the game in 1981, and when the Smithsonian later asked publishers to donate copies of their first software releases, *Pie Man* had its ticket to the national shrine.

Before making the adjustment from traditional art to computer graphics, Kosaka had spent years painting people and landscapes around California. "The computer is a whole different medium," he explains. "You can't apply certain things that you can on a sheet of paper. A dog, for instance, can't always be described in detail with two eyes, two ears and a tongue lolling out the side of its mouth. You often have to suggest the details of objects, making the viewer's mind fill in what can't be portrayed on the screen."



You can paint the title screen from *Rescue on Fractalus* using any graphics program, and following these eight simple steps.

Now a veteran electronic artist, he says the quirks of computer graphics should be seen as features—things you can use, instead of obstacles standing in your way. He also suggests collecting reference material: art books, catalogs, travel brochures, illustrator's guides and magazines filled with pictures. *Life* is among his favorites.

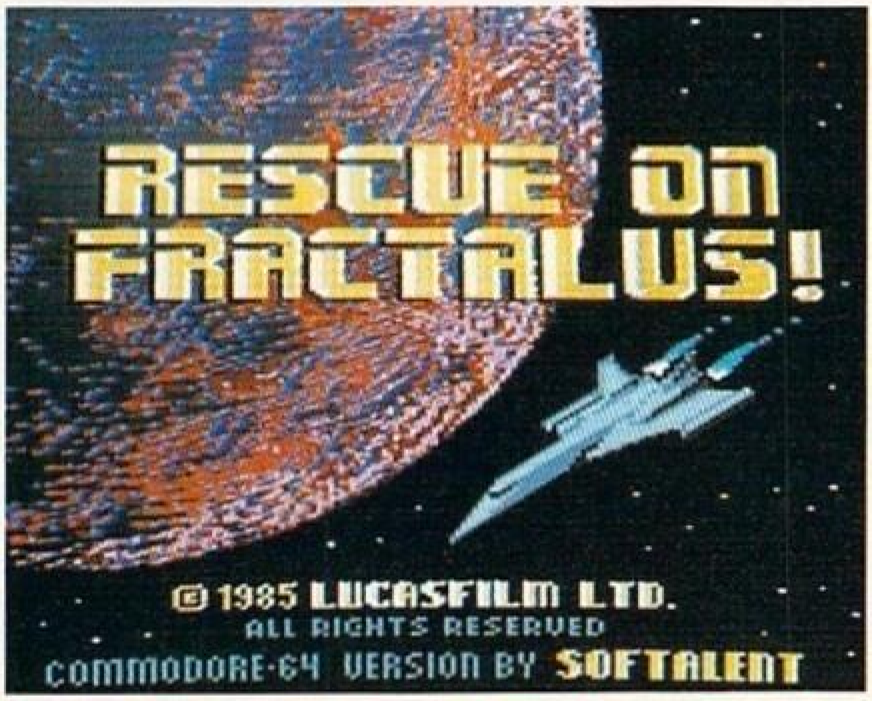
"Then," he says, "if you need to draw a fish or a car, you can go find a picture of one. You can't just draw what your mind thinks looks like a car. You need to go look at a car, study it carefully, and then try to draw it."

Kosaka became employed as a professional computer artist after the publication of *Pie Man,* working first for Data Age, later for Atari and finally at Epyx. His work has appeared in VCS and home computer versions of popular games like *Crystal Castles, Track and Field, Summer Games II* and *G.I. Joe.*

Rescue on Fractalus

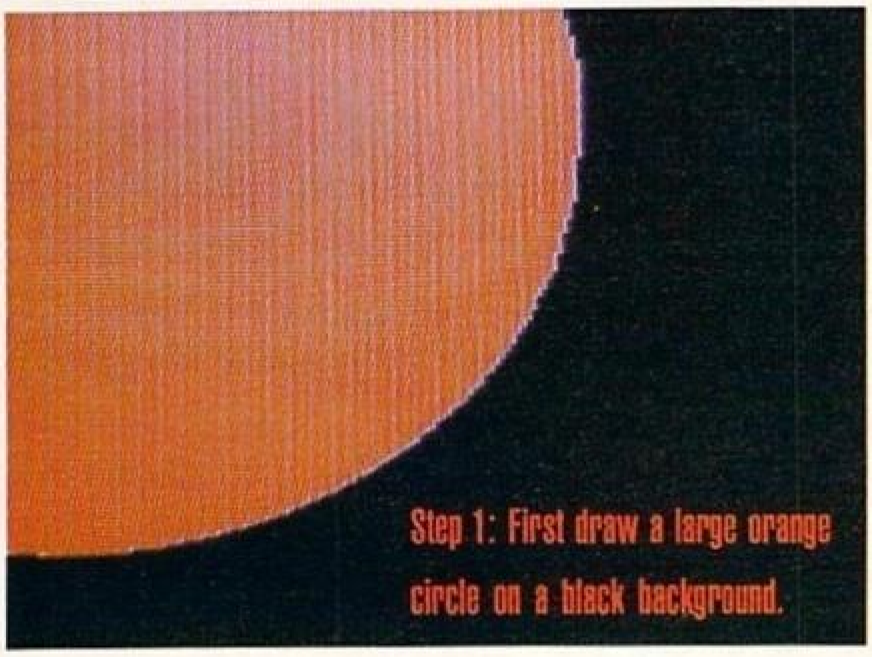
The computer game *Rescue on Fractalus* was developed by Lucasfilm Limited, the motion picture company owned by *Star Wars* creator George Lucas. When Epyx prepared the Commodore 64 version of the game for release, Kosaka got the assignment of creating a title screen.

Using a Commodore 64, KoalaPad drawing tablet and *KoalaPaint* software, the artist went to work. Several hours later, Kosaka felt satisfied with the results: The title screen was simple, yet appealing.



Using any graphics package, you can create a title screen like this one following six basic steps.

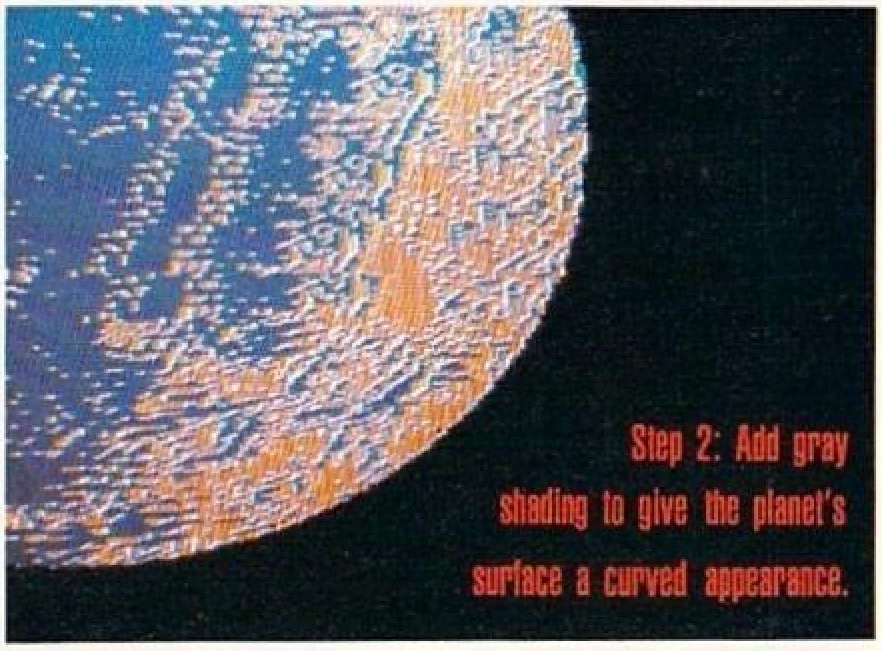
This demonstration shows you how to "paint" Kosaka's title screen using almost any popular graphics program. The picture includes the title of the game and sets the scene. Six steps demonstrate how to combine art and text, applying a few tricks along the way.



Step 1: First draw a large orange circle on a black background.

Step 1: Starting with a black screen, draw an orange circle on the left side of the display (your painting software should have a command that will draw the circle for you.) This will be the background shape defining the planet Fractalus. Make the circle too large to fit completely in the picture—this gives the planet greater presence and suggests its enormous size. If you drew Fractalus small enough to fit within the confines of the screen, it would have far less impact. Position the right edge of the disk about two-thirds of the way across the screen and leave room at the bottom for the credits.

Kosaka explains that orange is a good background color because it makes the planet look more exotic. "Greens or blues would make it comfortable and earthlike, and all the other colors were too flat or too garish for this picture. I wanted a volatile-looking planet with hot colors."



Step 2: Add gray shading to give the planet's surface a curved appearance.

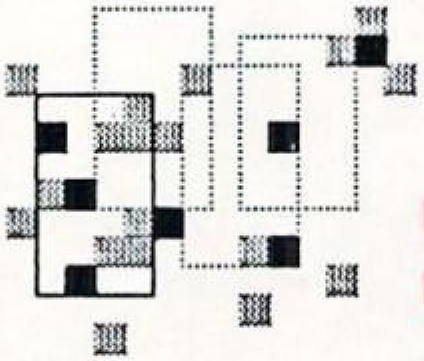
Step 2: Add gray shading to give the planet's surface a curved appearance. The light source will be on the right, so the shading must look darker on the left side of the planet. Starting with solid gray at the left edge, gradually make the shading less solid as you go to the right. Near the right edge, the patches of gray should be no larger than three or four pixels.

The gray patches on the right side of the planet will appear a bit lighter than the solid gray on the left—large areas of color on a computer screen have more chroma, or color intensity, than smaller areas. In this picture, the effect helps support the illusion of light hitting the right side of the planet and shade dominating the left.

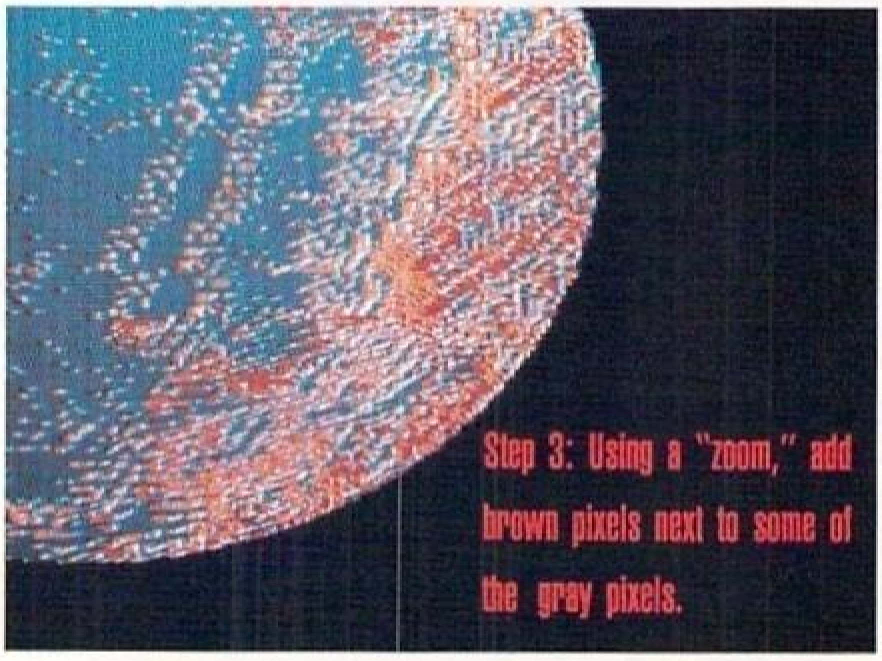
To suggest mountain ranges, leave two bands of orange near the middle, where the planet is making the transition from night to day. Because Fractalus has extremely rugged terrain, neither of the two areas, gray or orange, should be completely solid. Distributing dark patches on the sunlit side of the disk and spots of light in the gray, shaded area helps give the planet an uneven, natural appearance.

Now add touches of dark red to the intermediate area of shading. A trick Kosaka uses will help you accomplish this. He calls the technique "sponge painting." To make a "sponge," pick an area in the middle of the planet and change about half of the gray and orange pixels to dark red, creating a random pattern. Then use your painting software's "copy" command to make a small copy of the area. The copy should be a rectangle four pixels wide and eight pixels high. This will be your sponging block.

Now "paste" or stamp the block into the picture next to the original rectangle, overlapping it slightly. Paste the copy two more times, always overlapping the last impression. Avoid creating a regular pattern—you don't want the effect to look like the tiles on a kitchen floor.



Create a "sponge" to add texture to the surface.



Step 3: Using a "zoom," add brown pixels next to some of the gray pixels.

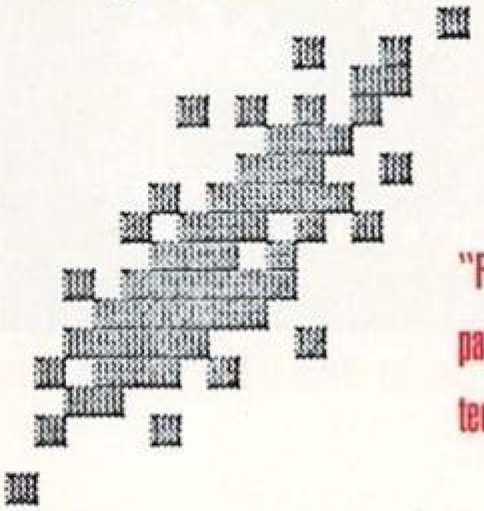
"Sponge painting" creates an irregular pattern that makes the planet look more natural.

After three uses of the stamp, make a new copy. Overusing the same stamp can also cause patterns to appear. Pick a spot in the middle of the area you were sponging to make the new copy. Paste the new copy into the picture two or three times as before. Continue sponge painting until you have added the dark red touches throughout the middle third of the planet, from top to bottom, taking care to leave the patches of gray as untouched as possible (limit the sponging to the orange areas).

Step 3: To add texture and shading to the right side of the planet, blend the gray into the red with touches of dark brown.

Using a "zoom" or close-up command, add brown pixels next to some of the gray pixels. The brown should be placed on the left side of the gray to enhance the shading effect.

Add a few brown streaks to suggest mountains. Be sure to "feather" the edges of every patch of color in the picture, including the areas of gray.

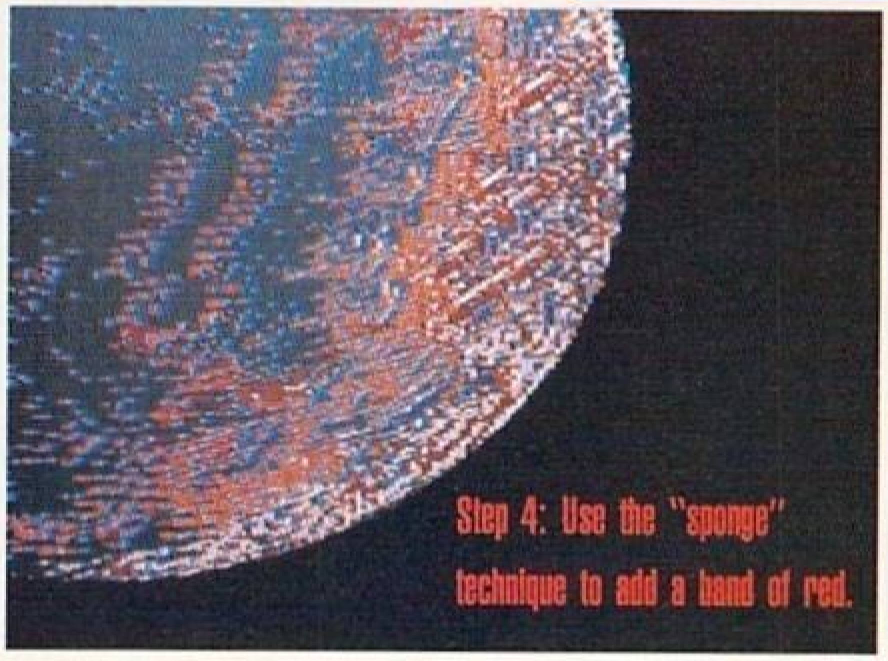


"Feather" the edges of every patch of color, using this technique, pixel by pixel.

"When I got to this point," Kosaka explains, "the orange spots in the shaded area started to look too bright, so I decided to change all of the orange pixels in the left-hand third of the planet to brown. I also scattered a few brown pixels in the middle, but only single pixels. The large patches of brown are restricted to the right side of the disk."

Step 4: To complete the shading effect, highlight the edge of the planet closest to the sun. Use the sponge technique to add light red in a band all the way around the edge, making the band about eight pixels wide at the center and tapering it to a single pixel at the top and bottom.

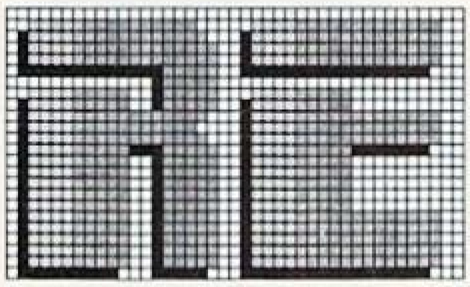
Now use the close-up mode again and go over the entire planet piece by piece, removing any box shapes left by the rectangular "sponge." Try to create the rough, uneven appearance of nature.



Step 4: Use the "sponge" technique to add a band of red.

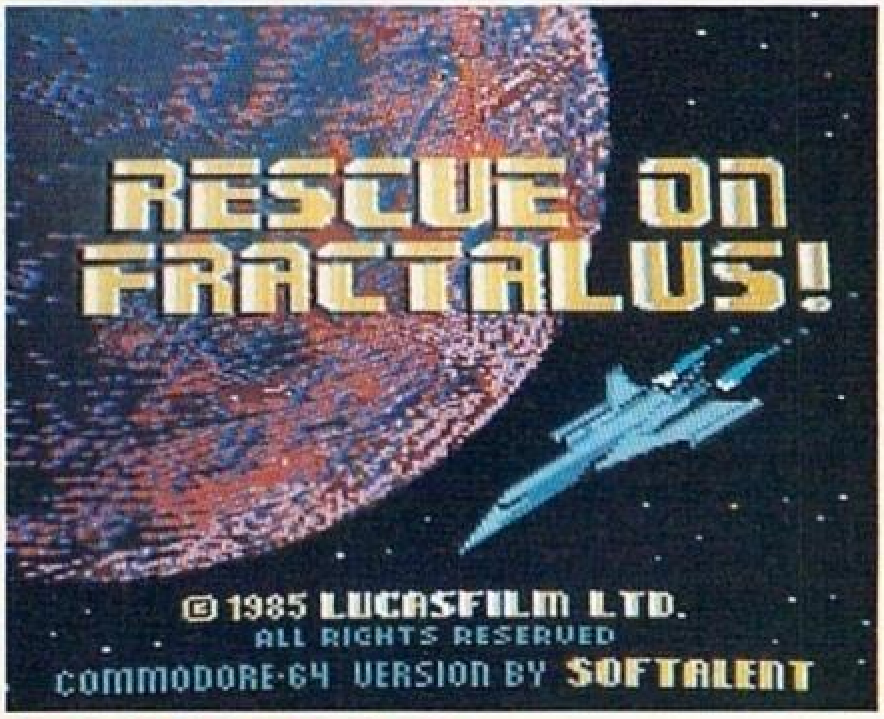
Step 5: Draw the letters in the title, referring to the example. Because of the detail in the planet, you may find it easier to create the title first on a blank screen, pasting it into the picture when complete. Draw the letters in yellow, adding a vertical band of white to the left side of the letters. This gives them a more three-dimensional appearance.

Draw a thin, one-pixel black border on the left side and bottom of each letter. This makes them stand out better.



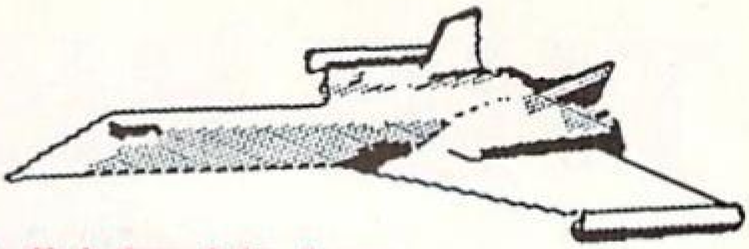
Create the letters in a grid on a separate screen and paste them onto your picture. Note the one-pixel black border on the left and bottom edges.

The credits at the bottom of the screen are a smaller version of the type of letters used in the title, and are displayed in blue and white.



Step 5: Add the letters in the title.

Step 6: Add the ship to your screen.

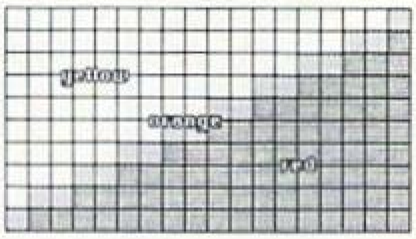


Draw the ship in three shades of gray.

Step 6: The ship is drawn in three shades of gray, and the flames are white, light blue and dark blue. To eliminate the jagged edges along the wings and fuselage, draw a dark gray border all the way around the ship. This technique is called "anti-aliasing." You eliminate the jaggedness by combining the ship color and the background color, applying the intermediate color along the edge between the two parts of the picture.

You can use this trick to soften jagged edges whenever they occur. Just pick an intermediate shade combining the two colors meeting at the jagged line and add the new color along the edge. For instance, an orange border can eliminate the jaggedness along a straight line between red and yellow.

Use "anti-aliasing" to smooth the jagged edges where two colors meet.



To complete *Rescue on Fractalus,* add stars at random in the black areas of the picture. About half of the stars are single-pixel dots. The rest are two pixels wide. For variety use different colors for the stars, alternating red, yellow, blue and white.

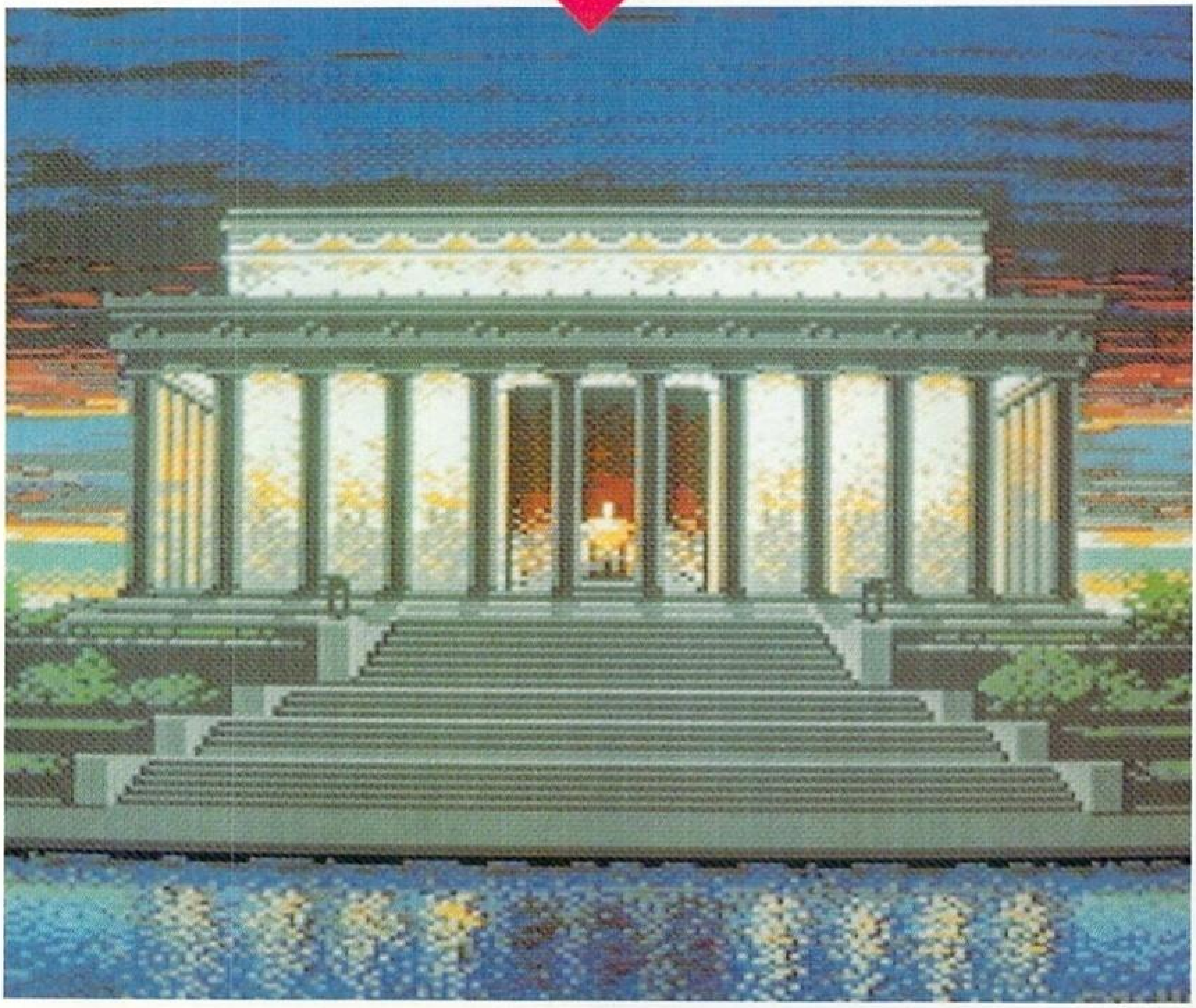
Your picture is finished, and you've learned a few things about computer art along the way. But Kosaka says the most important secret he can offer is this: Have fun while you're drawing.

"If you enjoy what you're doing, it shows. It's of primary importance to have some fun during the process of creating art, because your enjoyment shows in the finished product."

So if you get tired or frustrated in the middle of a computer "painting" session, stop and take a break. Don't go back to work until you're ready. Then, with renewed creative energy, pick up where you left off. You'll be ready to have fun again, and the improved results of your efforts will surprise and delight you.

THE BEST OF C64 GRAPHICS

Winners of the Commodore 64 Graphics Contest



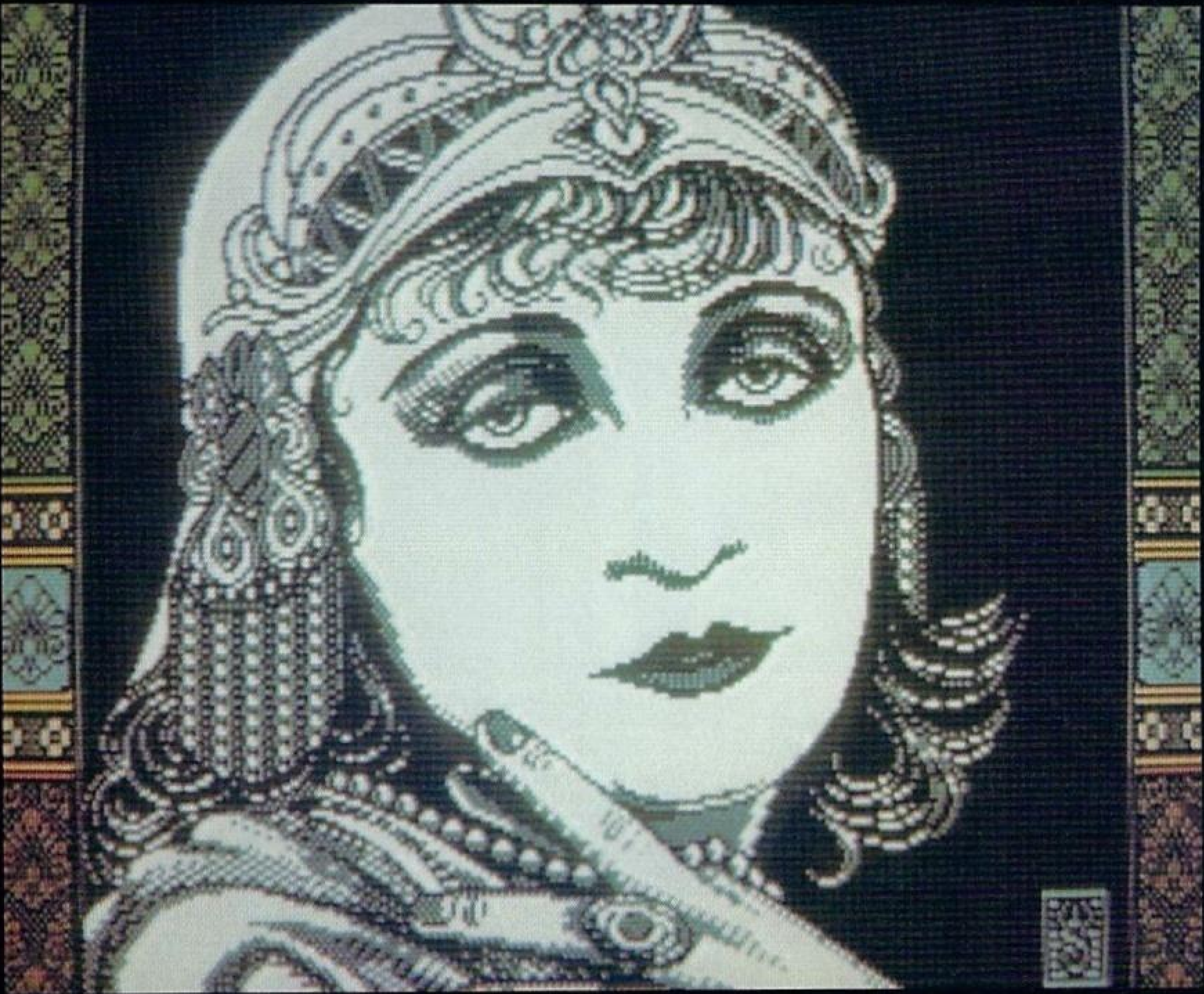
FIRST PLACE

Lincoln Memorial at Night by James D. Sachs, Lake Arrowhead, California
The outstanding technical proficiency and classic beauty of our winner got it an overwhelming first-place vote from our judges. Viewed in its intended medium — the computer screen — this piece glows with a magical light that we simply cannot reproduce in print. Take a close look at the unflinching attention to detail — even down to the shadows cast by the pillars. This is an excellent piece of work.

Last October, we invited our readers to participate in a Commodore 64 graphics contest — and we discovered, to our delight, that they are a very talented group. By January 31, the contest's deadline, we had received over 200 disks, most of them containing two entries. The overwhelming majority were created using the KoalaPad touch tablet and *KoalaPaint* software, but almost every other popular graphics package was also represented, including *Doodle, Micro Illustrator,* and *Flexidraw.* Some people also used a video digitizer to create some very interesting effects.

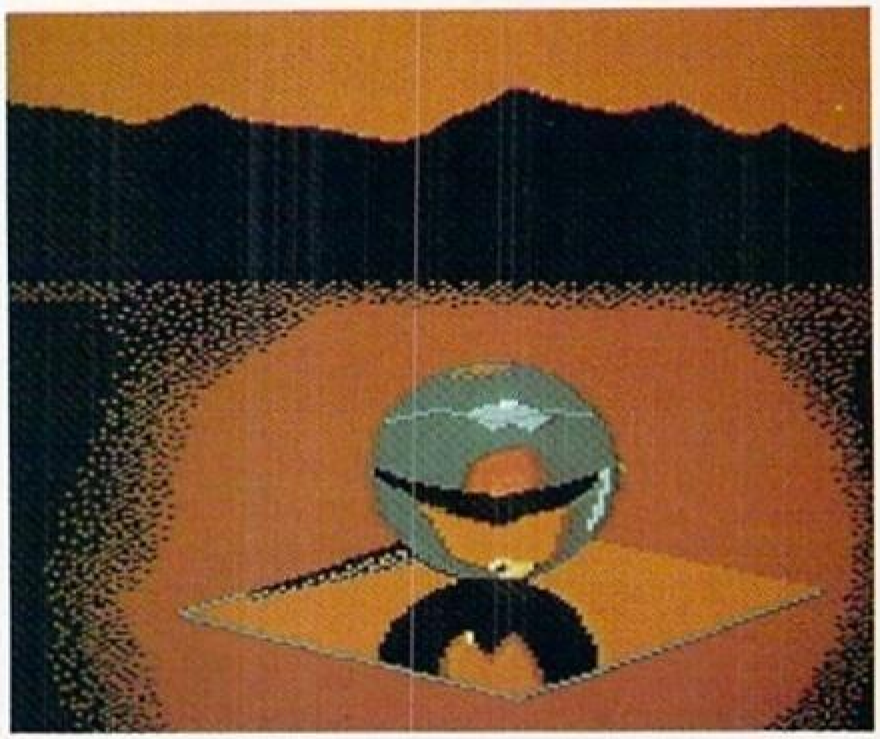
With so many excellent entries, judging was a long and difficult process that involved many hard decisions. But after a month of eyestrain, the judges finally came up with six prize winners and 16 honorable mentions. These winners, in the judges' opinions, showed the most originality, creativity and the best use of the 64's graphics capabilities.

Thanks to all of you who submitted entries. We only wish we had the space to print more of them. And special thanks to Louis Wallace and David Darus, whose graphics translation program, *Chameleon,* made the judges' job infinitely easier. *(Chameleon* appeared in the July/August, 1985 issue of *Commodore Microcomputers,* and is available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, phone 800-831-2694.)

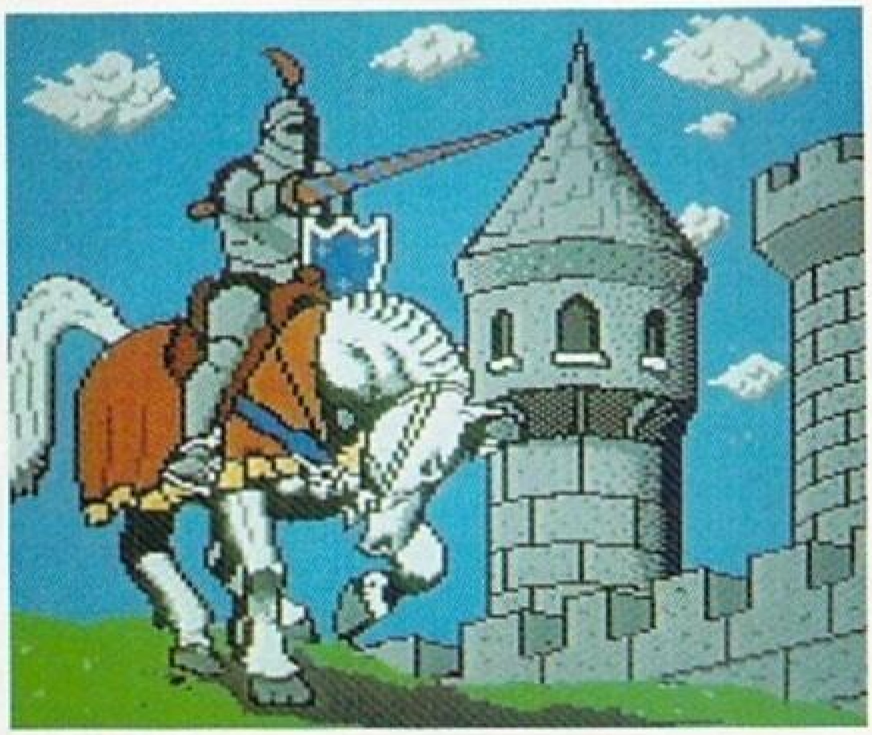


FIRST RUNNER-UP

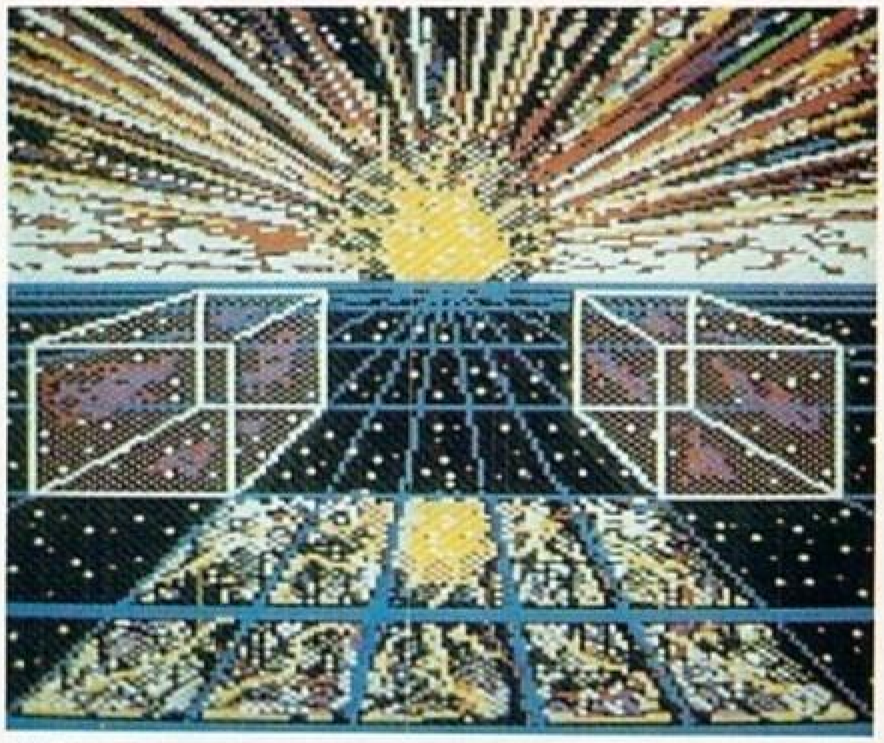
Pola Negri by Wayne Schmidt, New York, New York
The feel and flavor of an opulent era are caught here, woven in a tapestry of light. Look carefully at the detail in the headpiece, and how Wayne handles the curve of cloth over her shoulder and those delicate curls on her forehead. This sultry seductress deserves applause for both technical expertise and originality.



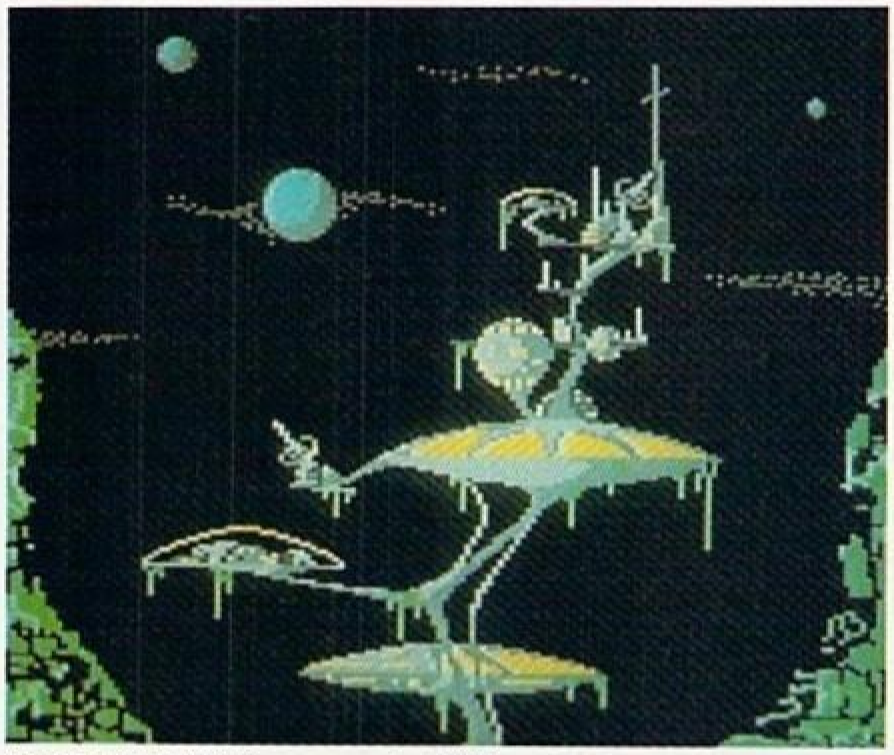
RUNNER UP
Reflect Glen M. Hedgepeth, Sherwood, Oregon
A mysterious, dream-like image with clean lines and thought-provoking perspective.



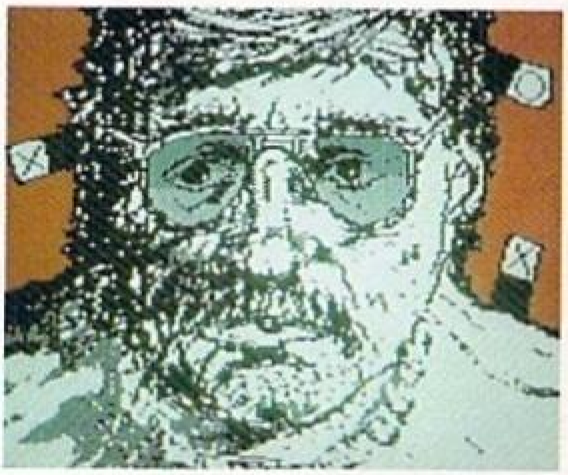
RUNNER UP
The Knight by Kem McNair, New Smyrna Beach, Florida
Graceful handling of curves and shadows gives this imaginary warrior a clear, realistic quality.



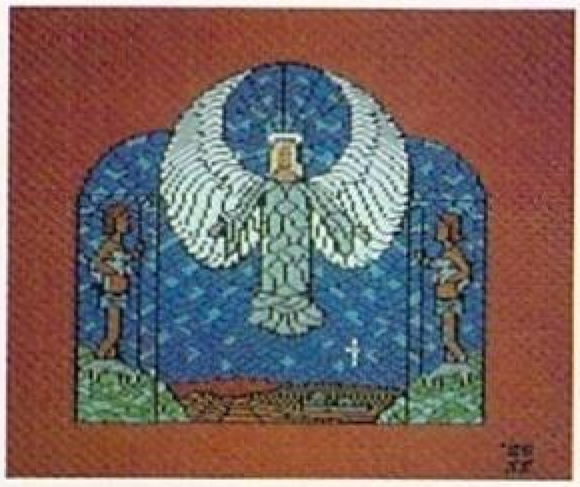
RUNNER UP
Sunrise by Mike Pike, Canoga Park, California
This colorful creation won votes on originality.



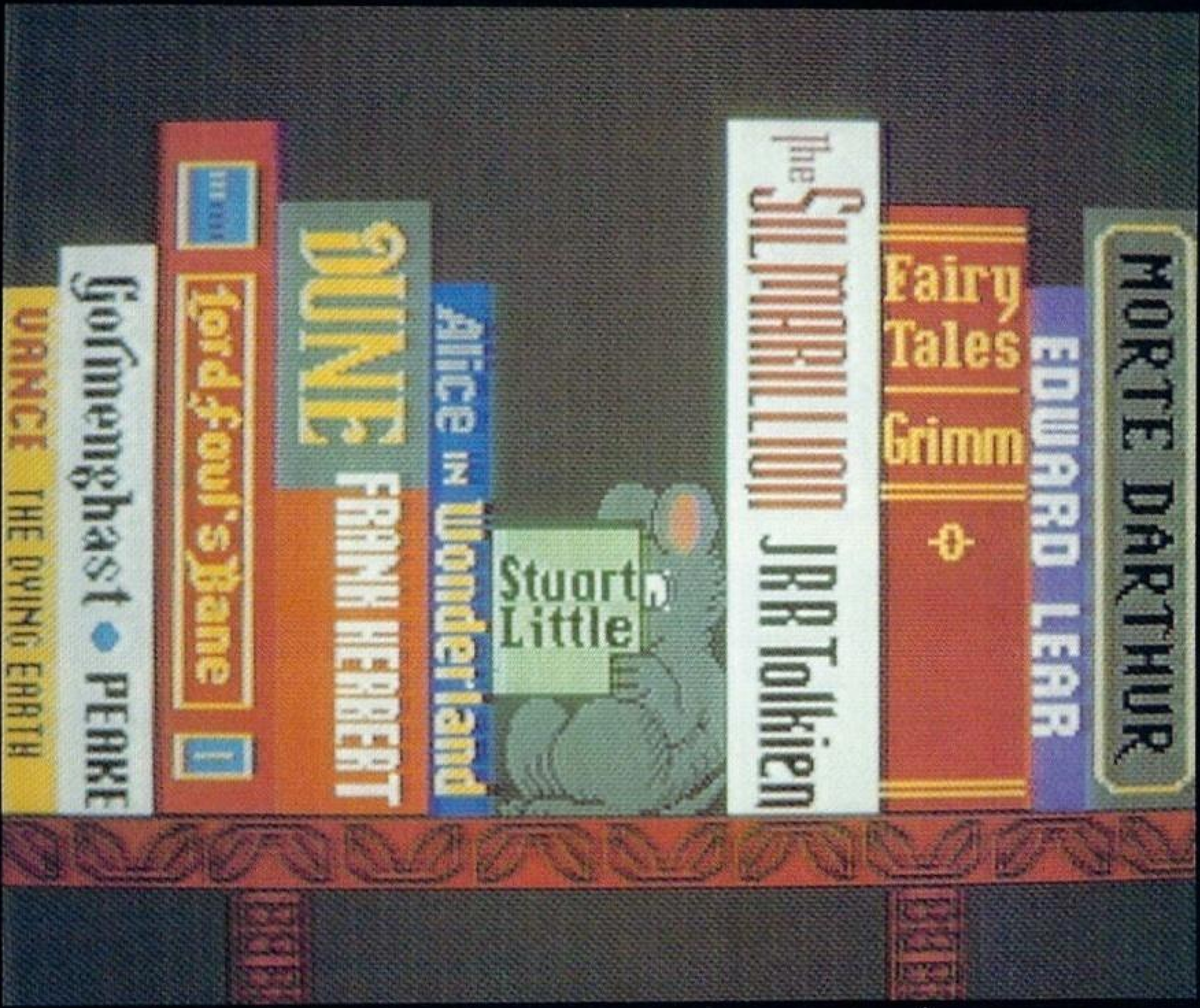
HONORABLE MENTION Outpost by William D. Baum, Klamath Falls, Oregon



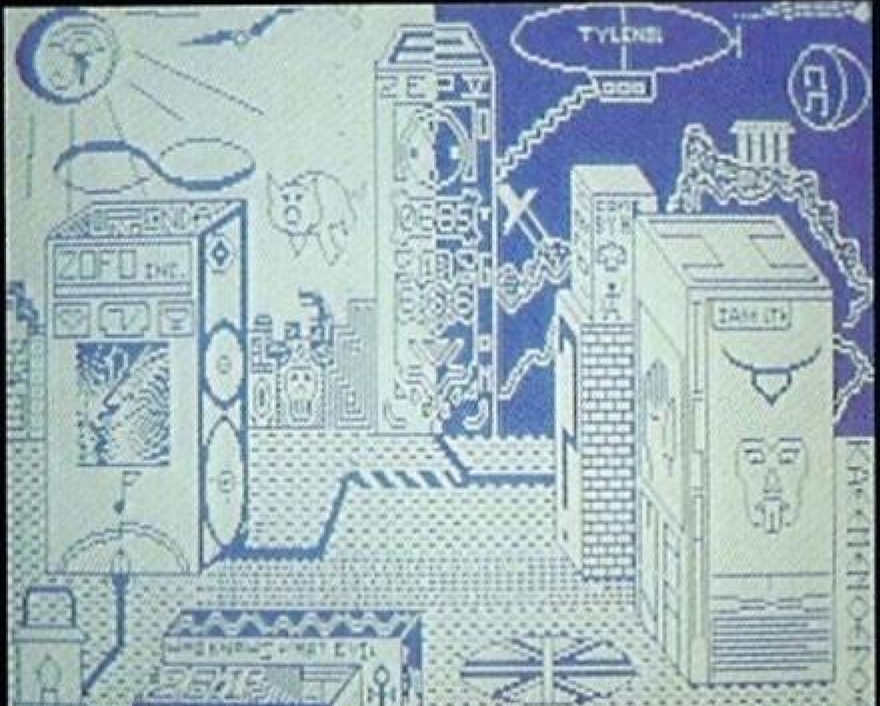
HONORABLE MENTION
Tab XO by Gene Reimann, Alpena, Michigan



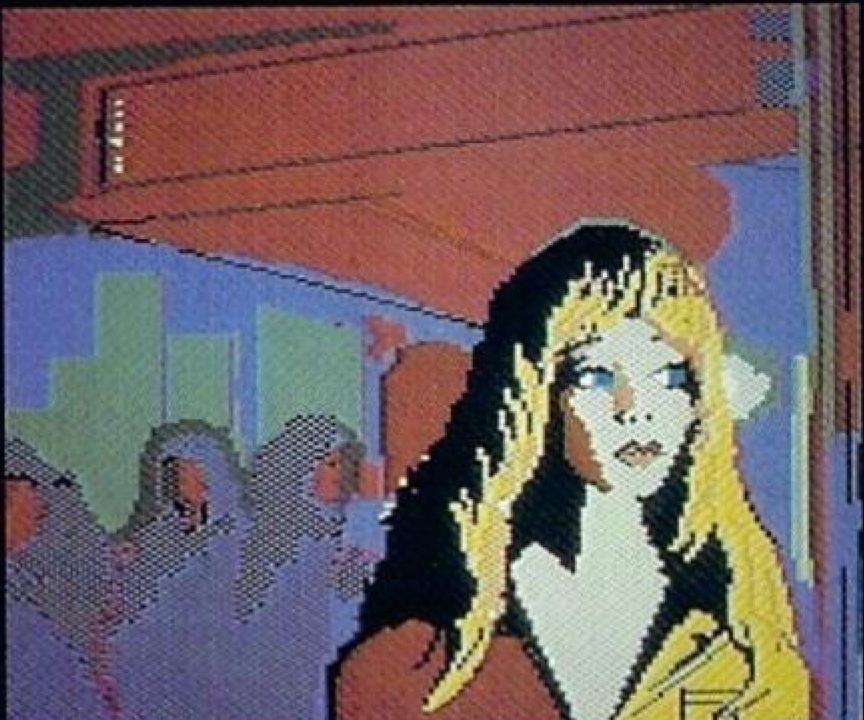
HONORABLE MENTION
Stained Glass by John D. Russo, Panama City Beach, Florida


VANCE THE DYING EARTH
Gormenghast ◆ PEAKE
Lord Foul's Bane
DUNE FRANK HERBERT
Alice in Wonderland
Stuart Little
The Silmarillion JRR Tolkien
Fairy Tales Grimm
EDWARD LEAR
MORTE DARTHUR

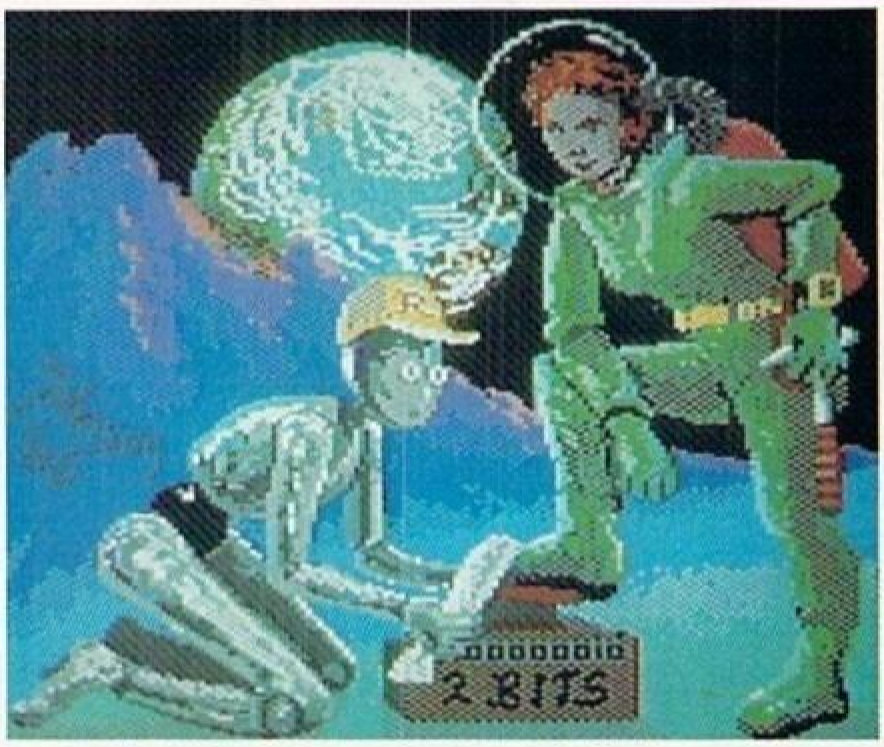
RUNNER UP
Fantasy Shelf by W.E. Meyers, Cary, North Carolina
This is an astonishing accomplishment in recreating typefaces, in addition to being a humorous idea. (For those of you who aren't up on children's books, **Stuart Little** is about a mouse.)


TYLENOL
ZOFO INC.

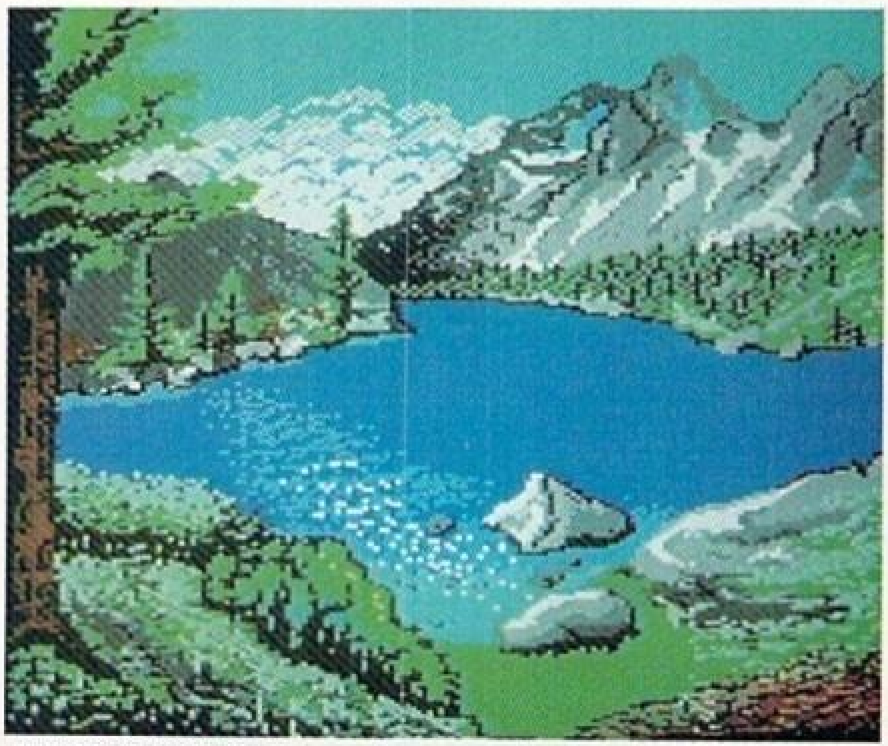
HONORABLE MENTION Kaeemenoefoer by Larry Plona, Canton, Connecticut



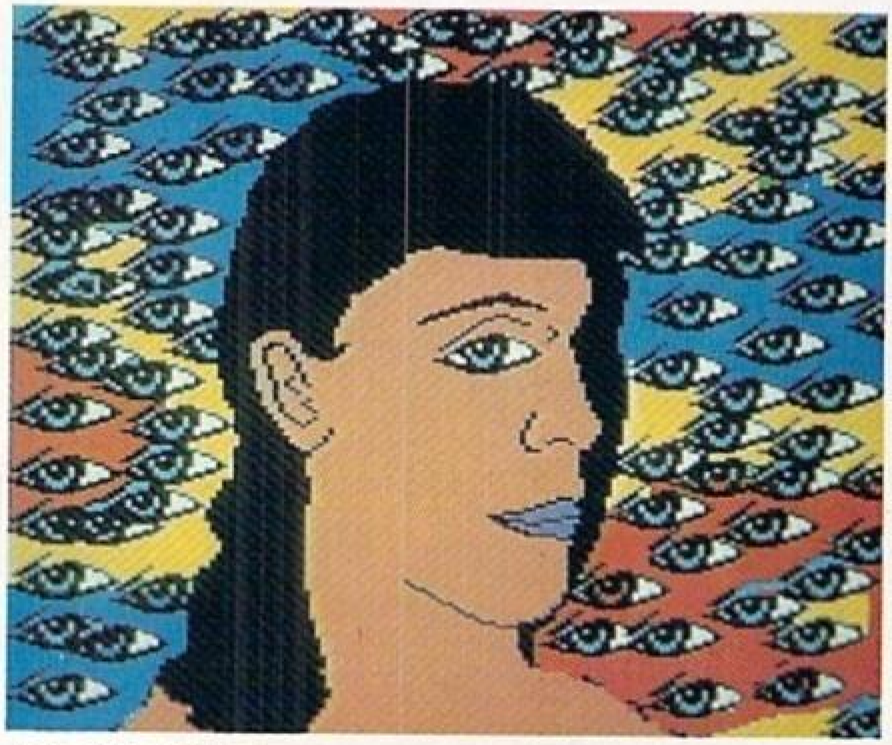
HONORABLE MENTION Night Light by Thomas Kane, Buffalo, New York



HONORABLE MENTION **Moonshine** by Eddie Johnson, Albuquerque, New Mexico

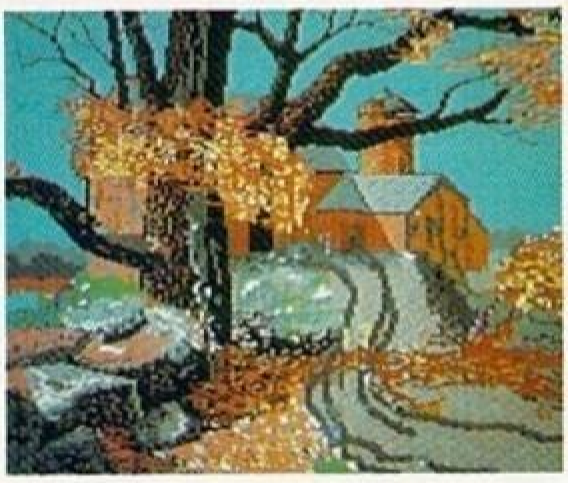


HONORABLE MENTION **Mountain Lake 2** by Karen E. Donelson, Santa Maria, California

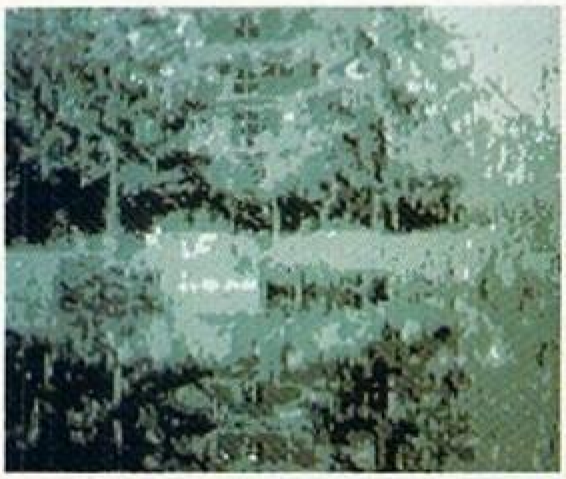


HONORABLE MENTION **Her Eyes Are Blue** by Laura Shanahan, Nashua, New Hampshire

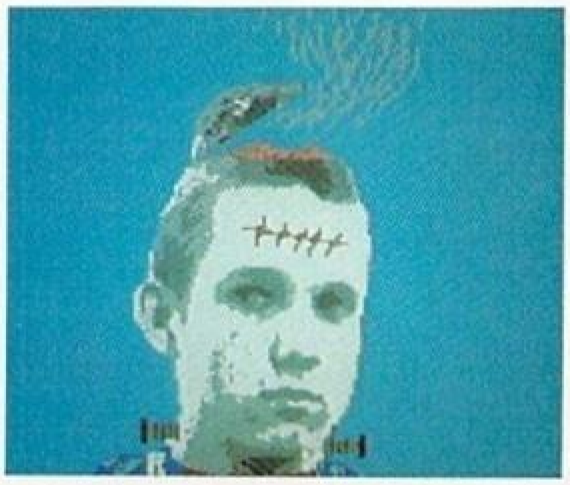
HONORABLE MENTION **Scene** by Daniel V. Morris, Waynesburg, Pennsylvania



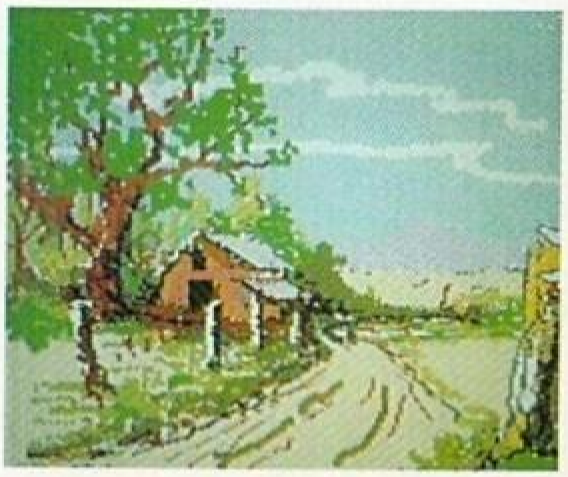
HONORABLE MENTION **Reflect** by Bill Luttrell, East Lansing, Michigan



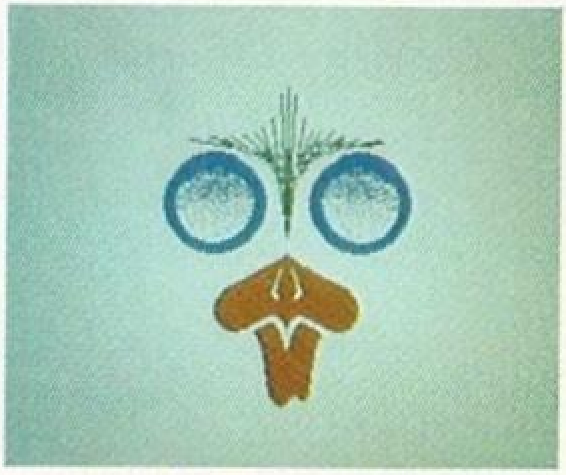
HONORABLE MENTION **Brains** by Nick Ellson, Tigard, Oregon

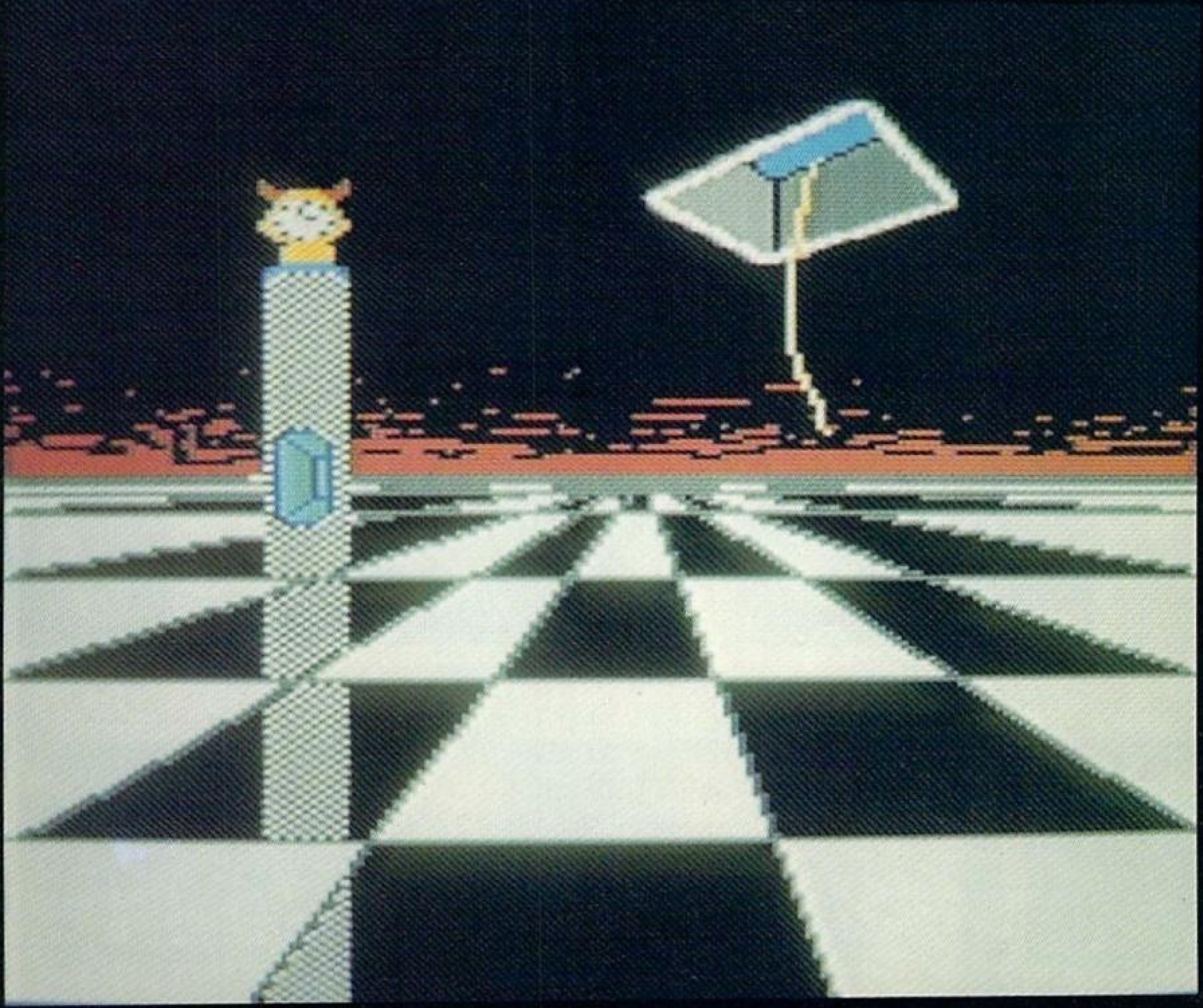


HONORABLE MENTION **Barn #1** by Walt Harned, Louisville, Kentucky

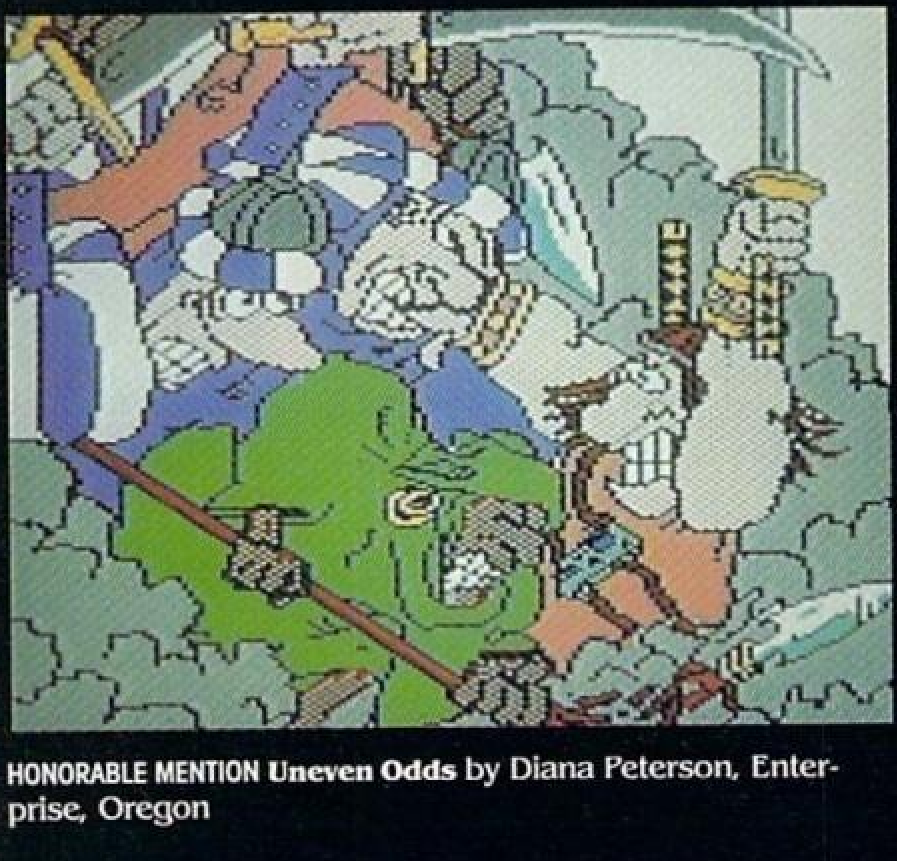


HONORABLE MENTION **Birdy** by Ron Farley, Noblesville, Indiana

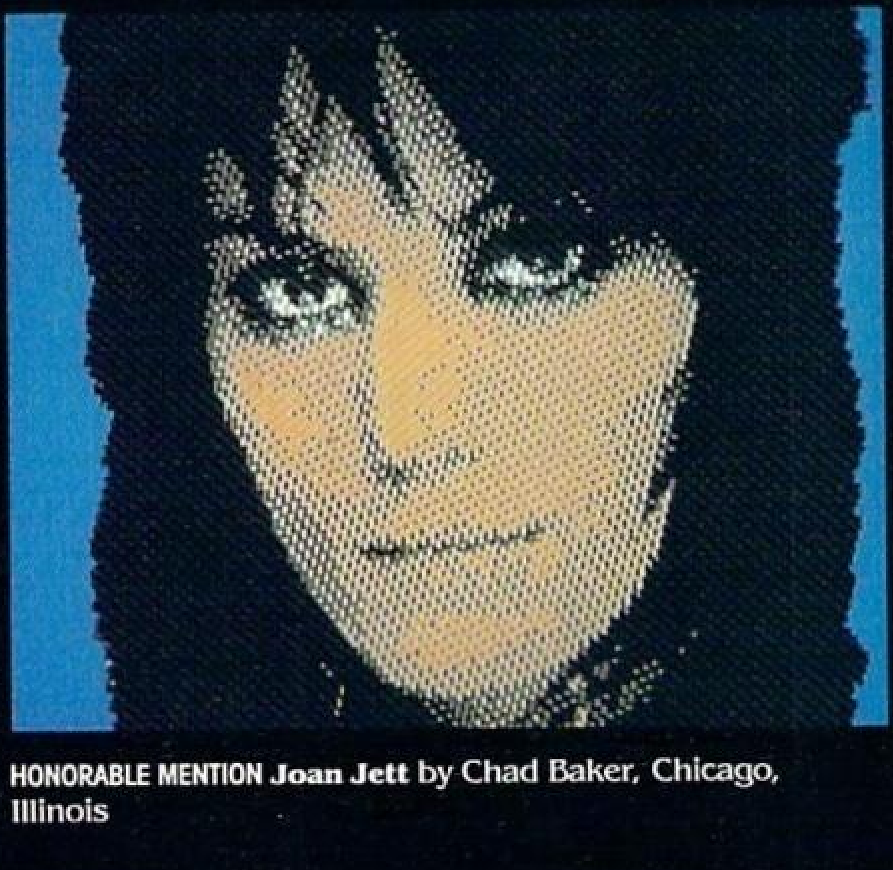




HONORABLE MENTION **Clock** by Peter Deal, Malvern, Pennsylvania

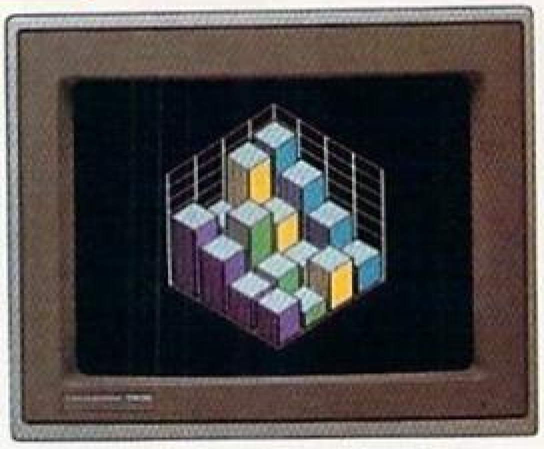


HONORABLE MENTION **Uneven Odds** by Diana Peterson, Enterprise, Oregon



HONORABLE MENTION **Joan Jett** by Chad Baker, Chicago, Illinois

All you need to do this



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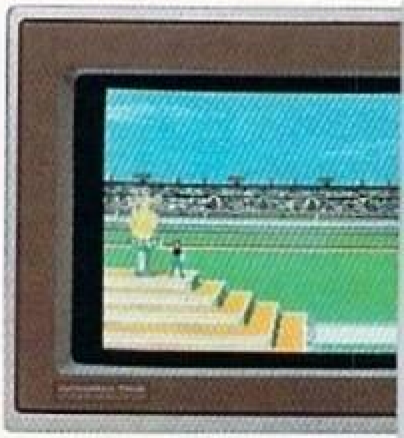

win a gold medal

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learn to type

dissect a frog

improve your chess

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e

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COMMODORE 128 PERSONAL COMPUTER
A Higher Intelligence

BY GARY V. FIELDS

BATTLE/64

for the Commodore 64

Computer controlled games can be both exciting and challenging, but the computer can't laugh when it wins or cry when you do. If you want that kind of emotional feedback, you'll need to play a human. That's what you'll be doing when you play "BATTLE/64."

One of my all-time favorite computer games was the original tank game. It was a very simple game of shoot and dodge. Whichever player scored the most hits won. But the opponents in that game were human. Friend against friend, in toe-to-toe combat, while the computer served as referee. I dropped more quarters than I'd like to admit into that game's coin slot.

So I decided to create my own tank game for my Commodore 64. But as usual, I got carried away a bit with added features. My final result is BATTLE/64. It requires two joysticks connected to two humans to play. (Computers are good, but I still have more fun competing with another human. One of the nice side effects of this game is that it brings people together.)

Now let me tell you about BATTLE/64.

First, it uses a special character set, so tanks look like tanks, explosions look like explosions, the depot icon is a pointed flag with a "D" on it and tree tops look like tree tops. (It is autumn and the trees are changing color from green to brown.) Each army's headquarters is displayed as a raised block with an "H."

If you want to freeze the game for any reason, press shifted P. The word PAUSE will appear and the battle will stop until another key is pressed or the fire button of the joystick attached to control port 2 is pressed.

If you want to quit, press shifted Q. Then at the prompt, press the F1 key and your 64 will execute a cold start. If you press any key other than F1, a new battle will begin.

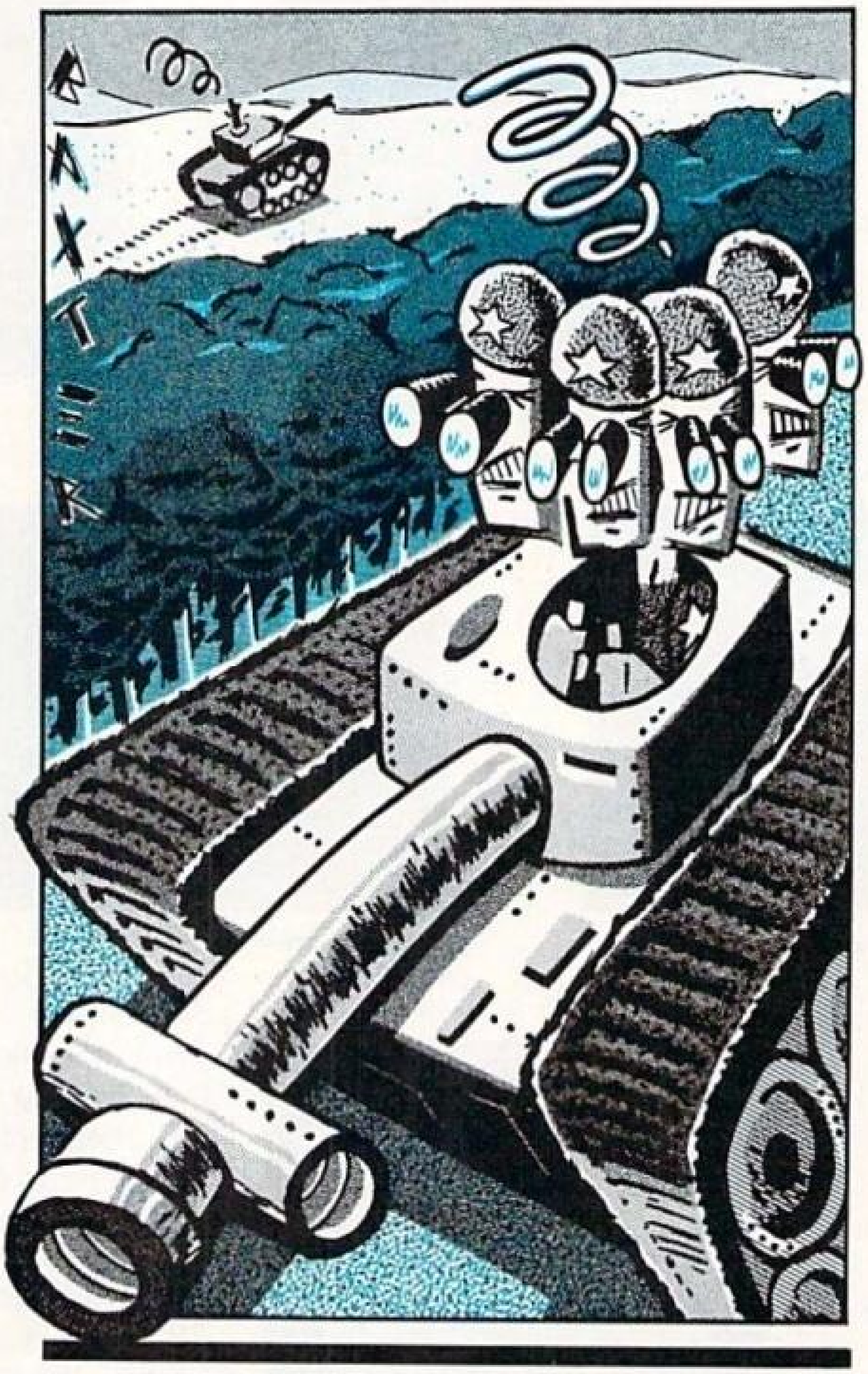
The battlefield itself is bordered on two sides by trees. The blue army's tank, headquarters and depot will appear on the left side of your monitor screen, while the red's appear on the right. The middle of the battlefield is divided by a broad minefield. Other, smaller minefields may appear elsewhere on the screen. (Note: all minefields are not marked.)

Each time the battlefield is drawn, the program randomly picks and hides a few "invisible" mines. So be careful where you send your tank. If it touches a mine, the mine will explode, damage your tank and reduce your life value by one. Each army's headquarters is always protected on three sides by minefields. Destroying a minefield with cannon fire is worth 25 points toward final victory.

Trees are also randomly displayed. Tanks must either go around them or blast them away. No victory points are awarded for destroying trees.

Each time your tank passes through a depot—either your own or your opponent's—your tank's fuel level is adjusted to 300 and ammo adjusted to 30 rounds. Destroying a depot is worth 500 victory points. Each tank begins the battle with a full tank of 400 gallons of fuel.

This tank shoot-and-dodge game lets you go toe-to-toe with a human competitor, using two joysticks and all the moxie you can muster.



Both depots and headquarters reappear periodically during play. Just because they have been used or destroyed does not eliminate them from the game. Both will reappear eventually.

Elevation is one of the most important and toughest features to master. Cannon fire rarely passes parallel to the ground. Tank guns are elevated to make their shells go a longer distance. On the top screen line are the letters ELEV. The blue "ELEV" displays the current elevation level of the blue army's tank. The red "ELEV" does the same for the red army's tank. The maximum elevation value, nine, will cause explosions to occur nine "spaces" from the firing tank. A value of one will cause the explosion to occur directly in front of the firing tank.

To elevate your tank's cannon, move the joystick either up (north) or down (south) while holding the fire button down. Be sure the joystick is pointed exactly up or down (not left or right) and the fire button is depressed.

To fire your tank's gun, just press the fire button. If your elevation was five, the explosion would occur five spaces from the tank. Your ammo value will be decreased by one, victory points, if any, will be added to your score, and the object will be destroyed. If the point of impact was a minefield, you will see and hear two explosions: one caused by your shell's impact and a second caused by the mine exploding. If you hit a depot, you will see and hear several explosions, since the depot contains ammo, which may explode, too.

To move your tank, simply move your joystick. The program checks only for up, down, left and right. Any other directions will be ignored and your tank will not move. You can move east or west and fire at the same time. But trying to fire while moving north or south would simply adjust your elevation value.

When either army's life value falls below a two, a "forward repair station" will appear about midway in the battlefield—red repair station for the red tank, blue repair station for the blue tank. This is a critical time in the game. This signals that one of the headquarters has reduced its defenses to establish this repair center. The repair center itself is of no value to the opposing army since it can be neither captured nor destroyed. But, while it is on the screen, its army's headquarters can be captured and the battle won. If the endangered tank can get to the station and repair and upgrade to a life value of two, the danger has passed, at least until the life value falls below a two again.

There are three possible outcomes of battle:

1. Complete victory, which occurs when an opponent's headquarters is captured.
2. A technical victory by either side. If neither side seizes their opponent's headquarters, the winner is selected by high score. The program displays this as a "tie" victory.
3. Tie. Neither army seized their opponent's headquarters and both final scores were identical.

Don't expect to win BATTLE/64 by simply outshooting your opponent. You'll have to plan your strategy and play by the rules if you want to win this battle.

The bottom line to winning is capturing your opponent's headquarters. To do this you must first reduce your opponent's life value below a two. Then you can seize their headquarters by causing your tank to pass through the headquarters icon. You must do this before your opponent can repair his tank.

BATTLE/64 is not a quick arcade game. You shouldn't expect tanks to move as fast as space ships. Therefore, don't expect to win using reflexes alone. You'll have to use your brain and pay attention to battlefield situations like fuel, elevation and ammo status. There are times when destroying your own headquarters or depot might be the difference between victory and defeat. But if you destroy your opponent's headquarters, instead of capturing it, you lose 500 victory points. So watch where you're shooting.

Special Notes

Because the program redefines the Commodore character set, it is designed to execute a cold start when you exit. This is to save you from having to turn your computer off and on to straighten all the internal pointers. The "SYS64738" in line 110 executes the cold start. I suggest you replace the SYS command with the "STOP" command until you have debugged your listing.

Line 183, contains POKE808,255. This POKE disables the RUN/STOP key. I suggest you leave this POKE out of your listing until you finish debugging your game.

Also note this listing begins at line 1 and lists consecutively to line 183. This is to make the game run as fast as BASIC will allow. But, there are no lines 3, 153 or 154. So while debugging your game, don't worry that the listing is short three lines. Those three never existed. When typing in the listing, be very careful. There are a lot of POKEs in this game, and, as you probably know, a POKE in the wrong place can cause your computer to crash. So, as always, be sure to save the program before executing a RUN. C

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

BATTLE/64

```
1 GOTO 155'BDKA
2 POKE 53281,0:POKE 53280,0:GOSUB 115
  :GOTO 68'EWEG
4 LA%=LA%-1:CL=TL+G1:EX%=PEEK(CL)
  :IF LA%<1 THEN LA%=0:RETURN'LHUQ
5 IF EX%=31 THEN LS%=LS%+25:GOSUB 24
  :GOSUB 24:RETURN'IUSM
6 IF CL=TR THEN IF RL%>0 THEN
  RL%=RL%-1:LS%=LS%+200:GOSUB 24
  :RETURN'MERS
7 IF EX%=60 THEN IF CL=1422 THEN
  LS%=LS%+500:GOSUB 24:GOSUB 24
  :GOSUB 24:RETURN'MFQT
8 IF EX%=61 THEN IF CL=1302 THEN
  LS%=LS%-500:GOSUB 24:GOSUB 24
  :RETURN'LCAS
9 GOTO 24'BCNH
10 RA%=RA%-1:CL=TR-G2:EX%=PEEK(CL)
   :IF RA%<1 THEN RA%=0:RETURN'LHCL
11 IF EX%=31 THEN RS%=RS%+25:GOSUB 24
   :GOSUB 24:RETURN'IUFH
12 IF CL=TL THEN IF LL%>0 THEN
   LL%=LL%-1:RS%=RS%+200:GOSUB 24
   :RETURN'MEFN
13 IF EX%=60 THEN IF CL=1505 THEN
   RS%=RS%+500:GOSUB 24:GOSUB 24
   :GOSUB 24:RETURN'MFEO
14 IF EX%=63 THEN IF CL=1625 THEN
   RS%=RS%-500:GOSUB 24:GOSUB 24
   :RETURN'LCWN
```

```
15 GOTO 24'BCNC
16 POKE SW,0:POKE SV,15:POKE SH,S1
   :POKE SL,S2:POKE SA,S3:POKE SS,S4
   :POKE SW,S5'HPKR
17 RP=INT(RND(0)*30)+1'FKCJ
18 IF RP<6 THEN POKE 1505,60
   :POKE 1505+AC,6'GTUM
19 IF RP>25 THEN POKE 1422,60
   :POKE 1422+AC,2'GUEO
20 IF RP=22 THEN POKE 1625,63
   :POKE 1625+AC,6'GUTG
21 IF RP=20 THEN POKE 1302,61
   :POKE 1302+AC,2'GUAG
22 IF FG=1 THEN RETURN'EDWD
23 FOR D=54272 TO 54296:POKE D,0:NEXT
   :RETURN'GREI
24 POKE CL,27:POKE CL+AC,7
   :IF LL%>0 THEN POKE TL,LS
   :POKE TL+AC,6'JEJO
25 IF RL%>1 THEN POKE TR,RS
   :POKE TR+AC,2'GQGK
26 POKE CL,28:POKE CL+AC,8'DMXI
27 S1=2:S2=120:S3=8:S4=0:S5=129
   :GOSUB 16:GOSUB 16:POKE CL,32
   :POKE CL+AC,0'KRAV
28 RETURN'BAQG
29 IF PEEK(CR)=31 THEN POKE TR,32
   :TR=CR:RL%=RL%-1:POKE TR,RS
   :POKE TR+AC,2'LMAX
30 IF PEEK(CR)=RS THEN CL=CR:GOSUB 24
   :GOTO 53'HQTH
31 IF PEEK(CR)=60 THEN RF%=300:RA%=30
   :GOTO 52'HVLJ
32 IF CR=1625 THEN IF LL%<2 THEN
   GOSUB 52:GOTO 93'IPLJ
33 IF PEEK(CR)=215 THEN RL%=2
   :RF%=RF%/2:RS%=RS%+100:GOTO 52'KHTP
34 RETURN'BAQD
35 IF PEEK(CR)=31 THEN POKE TL,32
   :TL=CR:LL%=LL%-1:POKE TL,LS
   :POKE TL+AC,6'LMMU
36 IF PEEK(CR)=LS THEN CL=CR:GOSUB 24
   :GOTO 58'HQSN
37 IF PEEK(CR)=60 THEN LF%=300:LA%=30
   :GOTO 57'HVEP
38 IF CR=1302 THEN IF RL%<2 THEN
   GOSUB 57:GOTO 93'IPOP
39 IF PEEK(CR)=209 THEN LL%=2
   :LF%=LF%/2:LS%=LS%+100:GOTO 57'KHWV
40 RETURN'BAQA
41 PRINT M1$G1 TAB(30)M2$G2'CNDE
42 FOR X=0 TO 16:PRINT:NEXT'FGJG
43 IF LL%<1 THEN LL%=0:LA%=0
   :LF%=0'GSTL
44 IF RL%<1 THEN RL%=0:RA%=0
   :RF%=0'GSRM
45 LF%=LF%-1:RF%=RF%-1:IF LF%<1 THEN
   LF%=0'IYVP
46 IF RF%<1 THEN RF%=0'EINK
47 PRINT M3$"[SPACE3]"TAB(23)M4$"
   [SPACE3]"'CJKK
48 PRINT M5$LA%TAB(23)M4$RA%'CPBM
49 PRINT M6$"[SPACE7]"TAB(23)M7$"
   [SPACE6]":PRINT M8$LF%TAB(23)
   M7$RF%'EAES
50 PRINT N1$"[SPACE5]"TAB(23)N2$"
   [SPACE6]":PRINT N3$LL%TAB(23)
   N2$RL%'EALK
51 PRINT N4$"[SPACE7]"TAB(23)N5$"
   [SPACE7]":PRINT N6$LS%TAB(23)N5$RS%
   :RETURN'FBCM
52 POKE TR,32:TR=TR+E%'DMAI
53 IF J2<3 THEN RV=RV+AD'FJVJ
54 IF J2>3 THEN RH=RH+AD'FJQK
55 AD=0:IF F2=0 THEN IF RA%>0 THEN
   GOSUB 10'INEN
56 RETURN'BAQH
57 POKE TL,32:TL=TL+E%'DMIN
58 IF J1<3 THEN LV=LV+AD'FJIO
59 IF J1>3 THEN LH=LH+AD'FJDP
60 AD=0:IF F1=0 THEN IF LA%>0 THEN
   GOSUB 4'IMCJ
61 RETURN'BAQD
62 IF RF%<1 THEN RETURN'EEVH
63 IF PEEK(TR+E%)=32 THEN 52'FKYK
64 CR=TR+E%:GOTO 29'DJVK
65 IF LF%<1 THEN RETURN'EEPK
66 IF PEEK(TL+E%)=32 THEN 57'FKXN
67 CR=TL+E%:GOTO 35'DJMN
68 GOSUB 41:J1=PEEK(P1):J2=PEEK(P2)
   :F1=J1 AND 16:F2=J2 AND 16'JFLW
69 J1=15-(J1 AND 15):J2=15-(J2 AND
   15)'GVVT
70 POKE SV,6:POKE SH,0:POKE SL,240
   :IF F2=0 THEN IF J2=1 THEN G2=G2+1
   :IF G2>9 THEN G2=9'PKOU
71 POKE SA,128:POKE SS,128:POKE SW,33
   :IF F1=0 AND J1=1 THEN G1=G1+1
   :IF G1>9 THEN G1=9'ONNV
72 IF F2=0 THEN IF J2=1 THEN G2=G2+1
   :IF G2>9 THEN G2=9'MSGQ
73 IF F1=0 THEN IF J1=2 THEN G1=G1-1
   :IF G1<1 THEN G1=1'MSNR
74 IF F2=0 THEN IF J2=2 THEN G2=G2-1
   :IF G2<1 THEN G2=1'MSTS
75 IF F1=0 THEN IF LA%>0 THEN IF J1=0
   THEN GOSUB 4'KLJQ
76 IF F2=0 THEN IF RA%>0 THEN IF J2=0
   THEN GOSUB 10'KMMR
77 IF LF%=0 THEN IF RF%=0 THEN 93'GKIQ
78 IF F1<>0 THEN IF J1=1 THEN IF LV>1
   THEN AD=-1:E%=-40:LS=36
   :GOSUB 65'QAHC
79 IF F2<>0 THEN IF J2=1 THEN IF RV>1
   THEN AD=-1:E%=-40:RS=38
   :GOSUB 62'QAUD
80 IF F1<>0 THEN IF J1=2 THEN IF
   LV<15 THEN AD=1:E%=40:LS=36
   :GOSUB 65'OBDT
81 IF F2<>0 THEN IF J2=2 THEN IF
   RV<15 THEN AD=1:E%=40:RS=38
   :GOSUB 62'OBQU
82 IF J1=8 THEN IF LH<38 THEN AD=1
   :E%=1:GOSUB 65:LS=37'KWTR
83 IF J2=8 THEN IF RH<38 THEN AD=1
   :E%=1:GOSUB 62:RS=39'KWGS
```

```
84 IF J1=4 THEN IF LH>0 THEN AD=-1
   :E%=-1:GOSUB 65:LS=37'MVPU
85 IF J2=4 THEN IF RH>0 THEN AD=-1
   :E%=-1:GOSUB 62:RS=39'MVCV
86 IF LL%>0 THEN POKE TL,LS
   :POKE TL+AC,6'GQKR
87 IF RL%>0 THEN POKE TR,RS
   :POKE TR+AC,2'GQFS
88 IF RL%<2 THEN POKE 1364,215
   :POKE 1364+AC,2'GVUU
89 IF LL%<2 THEN POKE 1523,209
   :POKE 1523+AC,6'GVPV
90 GET Q$:IF Q$="[SHFT Q]"THEN CR=0
   :GOTO 93'GLHM
91 IF Q$="[SHFT P]"THEN GOSUB 112'EFYK
92 GOTO 68'BCVH
93 FG=1:IF CR=1302 THEN
   LS%=LS%+1000'GUQQ
94 IF CR=1625 THEN RS%=RS%+1000'FQWP
95 GOSUB 41:PRINT"[HOME]";
   :FOR X=0 TO 39:PRINT CHR$(32);
   :NEXT'IQTS
96 IF CR=1302 THEN PRINT"[HOME,SPACE5,
   RVS,BLUE]*[SPACE4]VICTORY BY BLUE
   ARMY[SPACE4]*"'EGYW
97 IF CR=1302 THEN POKE CR,36
   :POKE CR+AC,6:GOTO 103'HWBV
98 IF CR=1625 THEN PRINT"[HOME,SPACE5,
   RVS,RED]*[SPACE4]VICTORY BY RED
   ARMY[SPACE5]*"'EGIY
99 IF CR=1625 THEN POKE CR,38
   :POKE CR+AC,2:GOTO 103'HWHX
100 PRINT CHR$(19)TAB(11)"[RVS,GREEN]
     * *[SPACE4]TIE[SPACE4]* * "'DHMB
101 IF RS%>LS%THEN PRINT"[HOME,RVS,
    RED] RED ARMY VICTORY "'EGDF
102 IF LS%>RS%THEN PRINT"[HOME,RVS,
    BLUE] BLUE ARMY VICTORY "'EGJG
103 DU=102:S3=0:S4=240:S5=33'EUXF
104 PRINT TAB(11)" [RED,RVS,SPACE4]F1
    [SPACE3,RVOFF,WHITE] TO QUIT"'CDYF
105 PRINT TAB(11)" [BLUE,RVS]
     ANY KEY [RVOFF,WHITE]
     TO PLAY"'CDGH
106 RESTORE:POKE 198,0:FOR X=0 TO 108
    :READ A:NEXT X'HQMI
107 GET Q$'BCWD
108 READ A,B:S1=A:S2=B:IF A=-1 THEN
    106'HRHL
109 GOSUB 16:FOR X=0 TO DU:NEXT
    :IF Q$=""THEN 107'IONM
110 GOSUB 23:FG=0:IF Q$=CHR$(133)THEN
    SYS 64738'HTJE
111 RUN 2'BBMW
112 PRINT"[HOME]":FOR DU=0 TO 18:PRINT
    :NEXT DU:PRINT"[GREEN,RVS]
     /PAUSE/ ":POKE 198,0'IRMJ
113 GET Q$:IF Q$=""THEN 113'EILD
114 RETURN'BAQA
115 LS=37:RS=39:LH=0:LV=5:RH=38:RV=12
    :P2=56320:P1=56321'ISNQ
116 SV=54296:SH=54273:SL=54272
    :SA=54277:SS=54278:SW=54276'GWQR
117 TL=1304:TR=1623:AC=54272:LA%=30
    :RA%=30:G1=5:G2=5'HQNR
118 LF%=400:RF%=400:LL%=9:RL%=9'EXEM
119 M1$="[HOME,BLUE]ELEV[WHITE]"
    :M2$="[RED]ELEV[WHITE]"'CHEK
120 M3$="[BLUE]AMMO[SPACE3]:[WHITE]"
    :M4$="[RED]AMMO[SPACE3]:[WHITE]"
    :M5$="[UP,BLUE]AMMO[SPACE3]
    :[WHITE]"'DLGH
121 M6$="[BLUE]FUEL[SPACE3]:[WHITE]"
    :M7$="[RED]FUEL[SPACE3]:[WHITE]"
    :M8$="[UP,BLUE]FUEL[SPACE3]
    :[WHITE]"'DLVI
122 N1$="[BLUE]LIVES[SPACE2]:[WHITE]"
    :N2$="[RED]LIVES[SPACE2]:[WHITE]"
    :N3$="[UP,BLUE]LIVES[SPACE2]
    :[WHITE]"'DLVK
123 N4$="[BLUE]SCORE[SPACE2]:[WHITE]"
    :N5$="[RED]SCORE[SPACE2]:[WHITE]"
    :N6$="[UP,BLUE]SCORE[SPACE2]
    :[WHITE]"'DLJL
124 PRINT"[CLEAR]"TAB(15)"[GREEN]B
    [BROWN]A[RED]T[L. GREEN]T
    [L. GREEN]L[ORANGE]E[BROWN]F
    [L. RED]I[RED]E[GREEN]L[L. GREEN]
    D[WHITE]"'CDWL
125 PRINT:FOR X=0 TO 39
    :PRINT"[BROWN]+";:NEXT
    :FOR X=0 TO 14:PRINT:NEXT'LPHM
126 FOR X=0 TO 39:PRINT"+";:NEXT
    :X=INT(RND(0)*30)+10:C=5'LVVO
127 FOR XX=0 TO X:T=INT(RND(0)*500)
    :POKE T+1144,43:POKE T+55416,C
    :IF C=5 THEN C=6'PMCW
128 C=C+1:IF C>9 THEN C=5'GINK
129 NEXT'BAEG
130 X=INT(RND(0)*10)+4'FJED
131 FOR XX=0 TO X:T=INT(RND(0)*500)
    :POKE T+1144,31:POKE T+55416,11
    :NEXT'MJZO
132 X=INT(RND(0)*6)+4'FIMF
133 FOR XX=0 TO X:T=INT(RND(0)*500)
    :POKE T+1144,31:POKE T+55416,0
    :NEXT:XX=0'NMDR
134 FOR X=0 TO 14:POKE 1162+XX,31
    :POKE 1163+XX,31:POKE 1164+XX,31
    :POKE 1165+XX,31'LTVS
135 POKE 1162+AC+XX,11:POKE
    1163+AC+XX,11'GXPM
136 POKE 1164+AC+XX,11:POKE
    1165+AC+XX,11:XX=XX+40:NEXT'JGQR
137 D1=1505:D2=1422:POKE D1,60
    :POKE D2,60:POKE 55777,6
    :POKE 55694,2'GQAR
138 H1=1625:H2=1302:POKE H1,63
    :POKE H2,61:POKE 55897,6
    :POKE 55574,2'GQUS
139 POKE H1+1,31:POKE H2-1,31
    :POKE H1+1+AC,11:POKE H2-1+AC,
    11'KGUT
140 POKE H1-40,31:POKE H2-40,31
    :POKE H1-40+AC,11:POKE H2-40+AC,
    11'KKUM
```

```
141 POKE H1+40,31:POKE H2+40,31
    :POKE H1+40+AC,11:POKE H2+40+AC,
    11'KKQN
142 POKE TL,LS:POKE TL+AC,6:POKE TR,RS
    :POKE TR+AC,2:RETURN'HBWM
143 DATA 63,0,255,219,219,195,219,219,
    255,61,0,255,219,219,195,219,219,
    255'BPTP
144 DATA 60,255,142,180,180,142,255,
    192,192,43,36,94,187,127,234,119,
    92,16'BPIQ
145 DATA 36,0,238,254,232,199,232,254,
    238,37,254,254,104,71,104,254,254,
    0'BOYQ
146 DATA 38,0,119,127,23,227,23,127,
    119,39,127,127,22,226,22,127,127,
    0'BLMR
147 DATA 31,0,204,0,51,0,204,0,51,27,
    16,147,199,235,203,203,8,8'BEFQ
148 DATA 28,22,52,8,3,216,4,62,38,29,
    66,0,194,11,68,34,65,152,-1'BFYS
149 DATA 23,181,29,223,29,223,29,223,
    23,181,29,223,29,223,29,223,
    23'BICT
150 DATA 181,29,223,29,223,29,223,23,
    181,17,195,17,195,17,195,17,
    195'BJDL
151 DATA 29,223,29,223,23,181,17,195,
    23,181,29,223,29,223,29,223,
    23'BIHM
152 DATA 181,29,223,29,223,29,223,23,
    181,-1,-1'BMYJ
155 POKE 53281,0:POKE 53280,0'CPLJ
156 PRINT CHR$(147):FOR X=0 TO 24
    :PRINT:NEXT X'HNAN
157 PRINT"[RED,RVS,SPACE5,CMDR *,
    RVOFF,SPACE2,BLUE,RVS,SHFT POUND]
     [CMDR *,RVOFF,SPACE2,RED,RVS,
    SHFT POUND,SPACE5,CMDR *,RVOFF,
    SPACE2,BLUE,RVS,SHFT POUND,SPACE5,
    CMDR *,RVOFF,SPACE2,RED,RVS]
    [RVOFF,SPACE2,BLUE,RVS,SHFT POUND,
    SPACE3,CMDR *]"'BARW
158 PRINT"[RED,RVS] [RVOFF,SPACE4,RVS]
     [RVOFF,SPACE2,BLUE,RVS] [RVOFF]
    [RVS] [RVOFF,SPACE5,RED,RVS]
    [RVOFF,SPACE8,BLUE,RVS] [RVOFF,
    SPACE5,RED,RVS] [RVOFF,SPACE2,
    BLUE,RVS] [RVOFF]"'BAJS
159 PRINT"[RED,RVS] [RVOFF,SPACE4,RVS]
     [RVOFF,SPACE2,BLUE,RVS] [RVOFF]
    [RVS] [RVOFF,SPACE5,RED,RVS]
    [RVOFF,SPACE8,BLUE,RVS] [RVOFF,
    SPACE5,RED,RVS] [RVOFF,SPACE2,
    BLUE,RVS] [RVOFF]"'BAJT
160 PRINT"[RED,RVS] [CMDR I4] [RVS,
    RVOFF,SPACE2,BLUE,RVS] [CMDR I]
    [RVOFF,SPACE5,RED,RVS] [RVOFF,
    SPACE8,BLUE,RVS] [RVOFF,SPACE5,
    RED,RVS] [RVOFF,SPACE2,BLUE,RVS]
    [CMDR I3]"'BABO
161 PRINT"[RED,RVS] [RVOFF,SPACE4,RVS]
     [RVOFF,SPACE2,BLUE,RVS] [RVOFF]
    [RVS] [RVOFF,SPACE5,RED,RVS]
    [RVOFF,SPACE8,BLUE,RVS] [RVOFF,
    SPACE5,RED,RVS] [RVOFF,SPACE2,
    BLUE,RVS] [RVOFF]"'BAJM
162 PRINT"[RED,RVS] [RVOFF,SPACE4,RVS]
     [RVOFF,SPACE2,BLUE,RVS] [RVOFF]
    [RVS] [RVOFF,SPACE5,RED,RVS]
    [RVOFF,SPACE8,BLUE,RVS] [RVOFF,
    SPACE5,RED,RVS] [RVOFF,SPACE2,
    BLUE,RVS] [RVOFF]"'BAJN
163 PRINT"[RED,RVS,SPACE5,RVOFF,
    SHFT POUND,SPACE2,BLUE,RVS]
    [RVOFF] [RVS] [RVOFF,SPACE5,RED,
    RVS] [RVOFF,SPACE8,BLUE,RVS]
    [RVOFF,SPACE5,RED,RVS] [RVOFF,
    SPACE2,BLUE,CMDR *,RVS,SPACE4,
    RVOFF,SHFT POUND]"'BAKQ
164 PRINT:PRINT TAB(13)"[WHITE]
    G.FIELDS/PF/TPC"'DEHL
165 PRINT:PRINT"[RVS,RED,SPACE18]1985
    [SPACE18,WHITE]"'CBYM
166 FOR XX=0 TO 6:FOR X=0 TO 300
    :NEXT X:PRINT:NEXT XX'JQHQ
167 PRINT"[HOME,BLUE,RVS,SPACE13]
    WAIT 35[RED] SECONDS[SPACE12]";
    'BBBQ
168 PRINT"[RVS,BLUE,SPACE6]
    WHILE THE TROO[RED]PS GET DRESSED
    [SPACE6,WHITE]"'BAUT
169 PRINT"[HOME]":FOR X=0 TO 11:PRINT
    :NEXT'GHDP
170 PRINT"[DOWN,BLUE,RVS,SPACE20,RED,
    SPACE20]";'BBYI
171 PRINT"[BLUE,RVS] BLUE ARMY
    : PORT 1[SPACE2,RED] RED ARMY
    : PORT 2[SPACE3]";'BBCN
172 PRINT"[BLUE,RVS,SPACE20,RED,
    SPACE20]";'BBHK
173 PRINT"[BLUE,RVS] TO WIN
    : CAPTURE ENE[RED]MY HEADQUARTERS
    (H) ";'BBKQ
174 PRINT"[BLUE,RVS] FOR FUEL
    : PASS THRU[RED] EITHER DEPOT
    (FLAG)";'BBTR
175 PRINT"[BLUE,RVS] FOR AMMO
    : PASS THRU[RED] EITHER DEPOT
    (FLAG)";'BBRS
176 PRINT"[BLUE,RVS] ELEVATE GUN
    : FIRE B[RED]UTTON & MOVE
    UP/DOWN"'BAXT
177 POKE 56,48:CLR'CGLL
178 POKE 56334,PEEK(56334)AND 254
    :POKE 1,PEEK(1)AND 251'GABS
179 FOR I=0 TO 2047:POKE 12288+I,
    PEEK(53248+I):NEXT'IXRU
180 POKE 1,PEEK(1)OR 4:POKE 56334,
    PEEK(56334)OR 1'GVXL
181 READ A:IF A=-1 THEN 183'FHII
182 FOR I=0 TO 7:READ B
    :POKE 12288+A*8+I,B:NEXT
    :GOTO 181'KVSP
183 POKE 53272,(PEEK(53272)AND 240)OR
    12:POKE 808,225:RUN 2'GFBP
```

END

BY JAMES C. HILTY

Spider Trap

for the Commodore 64

Colorado Jones must save Michigan Sue from the RAM spiders by weaving his way through a moving trap.

The two world-renowned explorers, Colorado Jones and Michigan Sue, have been searching for, and finding, hidden treasures for years. Many times they have faced dangers and have always managed to escape. But one day when Sue was searching for the lost ROM treasure, she was captured by the giant RAM spiders. The RAMs put Sue at the top of a large mountain, where the head spider, Syntax, stood guard over her.

Colorado Jones must save Michigan Sue from Syntax and the other RAM spiders. He must quickly work his way up the mountain, weaving his way through the trap which the spiders have set for him. Jones knows that if a RAM catches him, he will never save Sue. The RAMs know that Jones is a worthy adversary, so the spiders change the trap as Jones works his way up the mountain. They hope to confuse him so that he can never save Sue.

This is the setting for "Spider Trap," a game for the Commodore 64. The player must guide Jones through the spider trap to the top of the screen, where Sue is waiting to be rescued. Each time the game is played, a different trap is set by the spiders. The trap is similar to a maze, formed by numerous spiders.

Movement

The trap does not remain still for long. The spiders move up and down, and side to side, randomly and swiftly. But Jones is no slouch at moving quickly, either. Using a joystick in port one, the player can move Jones in any direction, including diagonally. A quick joystick reaction is required to keep Jones from being captured by the moving spiders. Syntax, the head spider, remains stationary, poised just below Sue, presenting yet another obstacle. Running into Syntax also means being captured.

Jones is a sprite controlled by a machine-language routine accessed by SYS 937. The spiders forming the trap are moved by another machine-language routine accessed from BASIC by using SYS 49152. The spiders are Commodore characters.

Scoring

You gain points just by eluding the spiders. Rescuing Sue earns you 250 bonus points. Hitting a spider costs you one of the four lives that you start the game with. Once you have exhausted your four lives, the game ends and a replay option is offered.

Will Colorado Jones once again save Michigan Sue

from danger? Will they go on to find yet another treasure? Will the RAMs and Syntax be beaten? Only you know the answer to these and other mind-boggling questions when you play Spider Trap! ◼

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Spider Trap

```
50 LV=5:F=0'CGJD
100 GOSUB 1000'BECV
104 GOSUB 1050'BEHA
110 PRINT"[CLEAR]"'BATW
112 PRINT"[GREEN]SPIDER[SPACE22,
    YELLOW]SCORE";F'BCDF
114 PRINT"[RED]TRAP[SPACE24,YELLOW]
    LIVES";LV'BDSH
116 FOR T=0 TO 1:PRINT"[CYAN]
    ******************[SPACE4]
    ******************":NEXT'FFCN
118 FOR T=0 TO 16:PRINT"**[SPACE35]**"
    :NEXT'FGRN
120 PRINT"******************[SPACE4]
    ******************"'BAYD
122 PRINT"***************************
    *************"'BAMG
130 FOR T=0 TO 35:X=680*RND(5)
    :POKE 1224+X,42:NEXT'JWXI
135 POKE 1762,32:POKE 1763,32
    :POKE 1764,32:POKE 1765,32'EGWL
140 POKE 1802,32:POKE 1803,32
    :POKE 1804,32:POKE 1805,32'EGCH
142 POKE 1842,32:POKE 1843,32
    :POKE 1844,32:POKE 1835,32'EGRJ
144 POKE 1882,32:POKE 1883,32
    :POKE 1884,32:POKE 1885,32'EGJL
146 POKE 1922,32:POKE 1923,32
    :POKE 1924,32:POKE 1925,32'EGON
150 POKE 53269,15'BIYC
160 W=PEEK(53279):Y=PEEK(53278)'ERJH
170 Q=192'BEID
180 FOR T=0 TO 800:NEXT'EGYG
200 SYS(937)'BFUW
210 Q=Q+1:IF Q=194 THEN Q=192'GMSD
214 POKE 2040,Q'BGRC
215 SYS(937)'BFUD
216 D=INT(4*RND(2)+1)'FITH
217 POKE 49522,D'BHNG
218 SYS(937)'BFUG
220 SYS 49152'BFMY
225 W=PEEK(53279)'CIMG
226 IF W=1 THEN 300'DFEG
227 Y=PEEK(53278)'CINI
228 IF Y=3 THEN 300'DFDJ
229 IF Y=5 THEN 500'DFHK
230 SYS(937)'BFUA
240 W=PEEK(53279):IF W=1 THEN 300'FOTG
245 F=F+1:PRINT"[HOME,DOWN]
    "TAB(33)F'EIKJ
250 GOTO 200'BDBC
300 LV=LV-1:PRINT"[HOME,DOWN2]
    "TAB(33);LV'EMHC
302 FOR T=0 TO 10:POKE 53286,2
    :FOR G=0 TO 50:NEXT G
    :POKE 53286,13'JDAK
305 FOR G=0 TO 50:NEXT G:NEXT T'FIWG
310 POKE 54290,128:POKE 54272,75
    :POKE 54277,0:POKE 54278,240'ELLH
312 POKE 54286,12:POKE 54287,5'CQGE
314 POKE 54296,207:POKE 54276,21'CSFG
320 FOR L=0 TO 15:POKE 54273,
    PEEK(54299)AND 224'GVIH
322 FOR T=0 TO 100:NEXT:NEXT
    :POKE 54276,0'GPCH
324 FOR T=0 TO 500:NEXT'EGVG
325 IF LV=0 THEN 328'DGHH
326 GOSUB 1034'BEJG
327 GOTO 110'BDBH
328 POKE 53269,0:PRINT"[CLEAR]"'CIXK
330 PRINT"[DOWN6]SORRY,
    THE SPIDER GOT YOU."'BACH
332 PRINT:PRINT:PRINT TAB(15)"SCORE ";
    F'EHVH
340 GOTO 600'BDFC
500 Z=54272'BGQB
502 RESTORE'BAOB
504 FOR L=0 TO 24:POKE Z+L,0:NEXT'GKQI
506 POKE Z+3,8:POKE Z+5,41:POKE Z+6,89
    :POKE Z+14,117:POKE Z+18,16'KGSS
508 POKE Z+24,143'CHVJ
510 READ FR,DR'BFYB
512 IF FR=0 THEN 540'DGSF
514 POKE Z+4,65'CFBG
516 FOR T=1 TO DR*2'EFHJ
518 FQ=FR+PEEK(Z+27)/2'FKIN
520 HF=INT(FQ/256):LF=FQ AND 255'FRJI
522 POKE Z+0,LF:POKE Z+1,HF'ELWI
524 NEXT'BAEF
526 POKE Z+4,64'CFAJ
528 GOTO 510'BDFK
540 FOR L=0 TO 24:POKE Z+L,0:NEXT'GKQI
542 F=F+250:PRINT"[HOME,DOWN]
    "TAB(33)F'EKMJ
550 GOSUB 1034'BEJF
552 GOTO 110'BDBH
600 PRINT:PRINT TAB(10)"PLAY AGAIN
    [SPACE2]Y OR N"'DEKH
610 GET JUNK$:IF JUNK$<>""THEN
    610'FOQH
620 GET A$'BCGD
621 IF A$=""THEN 620'DFYF
622 IF A$="Y" THEN 640'DFKH
630 END'BACD
640 F=0:LV=5'CGJG
644 GOSUB 1034'BEJJ
660 GOTO 110'BDBH
1000 PRINT"[CLEAR]":POKE 53281,0
     :POKE 53280,0'DQOX
1002 PRINT"[CYAN,DOWN10]
     PLEASE WAIT ONE MOMENT...."'BADD
1003 READ FR,DR:IF FR=0 THEN 1005'ENPB
1004 GOTO 1003'BEBX
1005 REM    READ ML SCROLL DATA'BQTD
1006 FOR X=49152 TO 49528:READ A
     :POKE X,A:NEXT'GSWG
1008 POKE 49523,2:POKE 49524,36
```

```
     :POKE 49525,5:POKE 49526,21'EIPK
1010 REM    READ ML JOYSTICK DATA'BSFY
1012 FOR X=828 TO 949:READ A:POKE X,A
     :NEXT'GOCC
1014 REM    READ SMITH SPRITE DATA
     1'BUGE
1016 FOR X=12288 TO 12350:READ A
     :POKE X,A:NEXT'GSFH
1018 REM    READ SMITH SPRITE DATA
     2'BUHI
1020 FOR X=12352 TO 12414:READ A
     :POKE X,A:NEXT'GSXC
1022 REM    READ SPIDER SPRITE
     DATA'BUXD
1024 FOR X=12416 TO 12478:READ A
     :POKE X,A:NEXT'GSJG
1026 REM    READ MICHIGAN SPRITE
     DATA'BWTH
1028 FOR X=12480 TO 12542:READ A
     :POKE X,A:NEXT'GSCK
1030 REM    READ SAVE ME SPRITE
     DATA'BURC
1032 FOR X=12544 TO 12606:READ A
     :POKE X,A:NEXT'GSEF
1034 REM    PREPARE SPRITES'BOYE
1036 POKE 2041,194:POKE 2042,195
     :POKE 2043,196:P=192
     :POKE 2040,P'FNUM
1038 POKE 53285,10:POKE 53286,13
     :POKE 53287,8:POKE 53288,14
     :POKE 53289,7'FRYP
1040 POKE 53290,3'BHXX
1042 POKE 53248,170:POKE 53249,210
     :          POKE 53251,135
     :POKE 53252,170'EOKJ
1043 POKE 53250,168'BJVC
1044 POKE 53253,62:POKE 53254,196
     :POKE 53255,52'DCCI
1046 POKE 53276,7'BHBF
1047 POKE 53264,0'BHVF
1048 RETURN'BAQF
1050 PRINT"[CLEAR]":PRINT"[DOWN10]
     "TAB(12)"SPIDER TRAP"'DEBF
1052 RM=30:POKE 54273,15:POKE 54277,16
     :POKE 54278,240'EHMJ
1054 POKE 54287,RM:POKE 54296,31
     :POKE 54276,21'DBMJ
1056 RM=RM-1:IF RM=10 THEN 1060'FOBK
1057 FOR T=0 TO 100:NEXT'EGRI
1058 GOTO 1054'BEHH
1060 FOR I=0 TO 24:POKE 54272+I,0
     :NEXT'GOYF
1061 W=PEEK(53279):Y=PEEK(53278)'ERJG
1062 RETURN'BAQB
1090 REM    MUSIC DATA'BJQF
1092 DATA 4817,2,5103,2,5407,2,8583,4,
     5407,2,8583,4'BQGM
1094 DATA 5407,4,8583,12,9634,2,10207,
     2,10814,2,8583,2'BTUP
1096 DATA 9634,4,10814,2,8583,2,9634,
     4,8583,12,0,0'BPEQ
1100 REM    ML SCROLL DATA'BMRX
1102 DATA 174,114,193,224,3,144,3,76,
     117,192,188,114,193,140,121,193,
     174'BMDI
1104 DATA 118,193,232,202,32,30,193,
     172,121,193,173,119,193,201,2,
     208,10'BMDK
1106 DATA 169,32,72,173,33,208,72,76,
     50,192,177,90,72,177,92,72,
     204'BHGL
1108 DATA 116,193,240,20,200,177,90,
     72,177,92,136,145,92,104,145,90,
     200'BLTO
1110 DATA 204,116,193,208,238,240,18,
     136,177,90,72,177,92,200,145,92,
     104'BMHH
1112 DATA 145,90,136,204,115,193,208,
     238,173,119,193,201,0,208,5,104,
     104'BMLJ
1114 DATA 76,111,192,104,145,92,104,
     145,90,236,117,193,208,160,96,
     172,116'BNEL
1116 DATA 193,200,189,114,193,170,32,
     30,193,173,120,193,201,2,208,19,
     136'BMNN
1118 DATA 169,32,153,122,193,173,33,
     208,153,162,193,204,115,193,208,
     239,240'BPVQ
1120 DATA 16,136,177,90,153,122,193,
     177,92,153,162,193,204,115,193,
     208,240'BOII
1122 DATA 236,117,193,240,37,202,32,
     30,193,172,116,193,200,136,177,
     90,72'BMUK
1124 DATA 177,92,32,48,193,145,93,104,
     145,90,32,56,193,204,115,193,
     208'BKQM
1126 DATA 234,236,117,193,208,221,240,
     46,202,206,118,193,232,32,30,193,
     172'BOMO
1128 DATA 116,193,200,136,32,48,193,
     177,90,72,177,92,32,56,193,145,
     92,104'BNQQ
1130 DATA 145,90,204,115,193,208,234,
     236,118,193,208,221,238,118,193,
     232'BMFJ
1132 DATA 32,30,193,173,120,193,201,0,
     240,20,172,115,193,136,200,185,
     162'BMTL
1134 DATA 193,145,92,185,122,193,145,
     90,204,116,193,208,240,96,189,89,
     193'BNJN
1136 DATA 133,91,24,105,212,133,93,
     189,64,193,133,90,133,92,96,72,
     152'BJRO
1138 DATA 24,105,40,168,104,96,72,152,
     56,233,40,168,104,96,0,40,80'BGBQ
1140 DATA 120,160,200,240,24,64,104,
     144,184,224,8,48,88,128,168,208,
     248'BLCK
1142 DATA 32,72,112,152,192,4,4,4,4,4,
     4,4,5,5,5,5,5'BQCI
1144 DATA 5,6,6,6,6,6,6,6,7,7,7,7,7,3,
     0,4,0,4,1,1'BOEJ
1150 REM    ML JOYSTICK DATA'BOCD
```

Continued on pg. 128

BY DAVID MALMBERG

Fractals and Other Diabolical Designs

"No one will be considered scientifically literate tomorrow who is not familiar with fractals," believes Professor John Wheeler of the University of Texas. The reason for this strong statement, according to Paul Davies, a professor at the University of Newcastle-upon-Tyne, England, is because "fractals delineate a whole new way of thinking about structure and form."

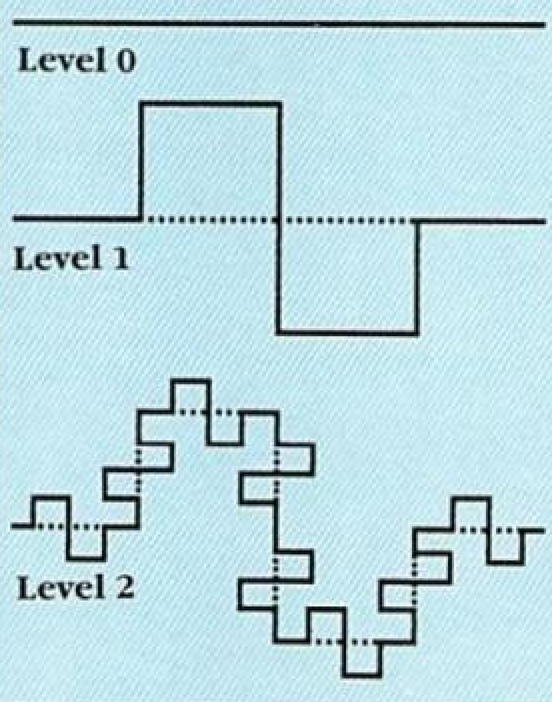
If these two quotes leave you puzzled and curious, you should feel in good company. Until just a few years ago, fractal was not even a word, let alone "a whole new way of thinking about structure and form." The word was coined by Benoit Mandelbrot in 1975 to describe things that had an irregular, somewhat chaotic shape or pattern, but were well-behaved enough that they could be described mathematically.

Mandelbrot has used his theory of fractals to mathematically describe such diverse and irregular phenomena as the stock market, the year-to-year pattern of floods and droughts of the Nile river, the shapes of trees and leaves, the weather, the density and severity of water pollution in the Great Lakes, and the length and shape of Britain's coastline. In Mandelbrot's capable hands, fractals have become a means to create mathematical order out of nature's (and man's) chaos.

In the hands of others, fractals have become a way to create stunning visual beauty out of mathematical formulas and computer graphics. Lucasfilm, the creator of the *Star Wars* film saga, for example, has long used fractals to generate computer images for film scenes. The Lucas organization has also developed several computer games (all available for the Commodore 64/128) using fractals to generate the background scenery. One of the games was even named to honor its fractal roots—Rescue on Fractalus!

> *Fractals have become a way to create stunning visual beauty out of mathematical formulas and computer graphics. Lucasfilm has long used fractals to generate computer images for film scenes.*

Figure 1. Mandelbrot's Square Snowflake



Just what is a fractal? A precise definition would require a lengthy and perhaps boring digression into higher mathematics. Fortunately, fractals are relatively easy to describe and are even easier to program in LOGO. Generally, a fractal is a shape or pattern that seems to be made up from smaller and smaller versions of the same overall shape.

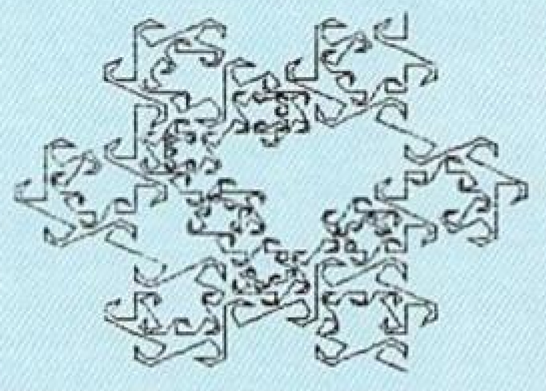
For example, a tree is one of nature's fractals. When you look at a tree from a distance, you see a few big branches. As you move closer to the tree, you see that these branches have branches themselves. As you continue to move closer, you see that each "level" of branch is itself composed of smaller branches until you finally see individual twigs.

This idea of a simple pattern being repeated over and over again in increasingly smaller scales, and of the various parts of the pattern resembling the whole pattern is called *self-similarity*, and is the most common property of fractals.

Two Types of Fractals

Fractals are divided into two main camps: random fractals and geometric fractals. Random fractals generally occur in nature, such as the patterns of trees, rainfall, the meandering of streams and rivers, or the shapes of clouds or mountains. By using computers and random fractal theory, it is possible to study these random phenomena and to better understand them. Similarly, by using computer graphics, it is possible to simulate random fractals, just as Lucasfilm and others have created beautiful artificial scenery on film that cannot be differentiated from nature's own.

Figure 2. Mandelbrot's Hooked Snowflake

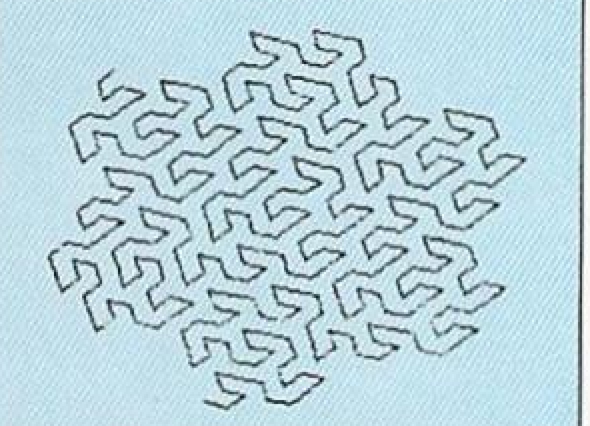


The designs we now call geometric fractals were a part of mathematics long before Mandelbrot coined the term fractal to describe them. Originally, these designs were developed at the turn of the century by maverick mathematicians who seemed to be rebelling against traditional Euclidean concepts of geometry, which held that a curve must be smooth, and that dimensions must be integers. Prior to that time, a line or a curve was considered to have only one dimension and a plane had two dimensions.

These maverick mathematicians contrived new forms of curves which became more and more “wiggly” (and, as a result, longer and longer) until the curve would fill the entire plane and have infinite length. These mathematicians argued that as their curves became increasingly “wiggly” and finally filled the plane, the curve would no longer be one-dimensional, but would become two-dimensional.

In 1919 a German mathematician, Felix Hausdorff, developed a quantitative way to measure a curve’s “wigglyness” and called this index the curve’s fractional dimension. When these mavericks first introduced their contrived curves almost a hundred years ago, their more traditional mathematician peers labeled the curves as “monsters,” “diabolical designs,” and “pathological.” Today, we know all of these types of curves as geometric fractals.

Figure 3. Gosper’s Flowsnake

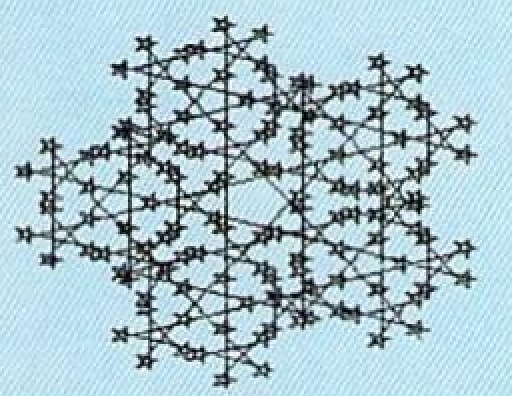


Fractals in LOGO

Drawing geometric fractals in LOGO is easy. To understand why, let’s see how a geometric fractal is created. Figure 1 shows one side of a fractal called “Mandelbrot’s Square Snowflake.” The top part of the figure shows a line that is labeled “level 0.” This line is called the *initiator*. The middle part of the figure labeled “level 1” is called the *generator*. Level 2 in the bottom of the figure shows how the generating shape is used to replace each occurrence of the initiator (i.e., each line segment) in the previous level.

This process of successively replacing each occurrence of the initiator with the generator shape could be repeated indefinitely through an infinite number of levels. In fact, to be a true fractal according to Mandelbrot’s definition, it must be repeated infinitely. In practice, however, approximating a fractal by drawing up to level 4 or 5 is quite sufficient to see the overall design. The initiator and the generator shapes are all that are needed to completely describe a fractal.

Figure 4. Abelson’s Cornered Polygons



Interestingly enough, the Square Snowflake fractal has a fractional dimension of 1.5 as defined by Hausdorff. By comparison, “Mandlebrot”’s Hooked Snowflake,” shown in Figure 2, has a Hausdorff dimension of 1.8687 and is quite a bit more “wiggly.”

The process of repeatedly replacing each occurrence of the initiator shape with the generator shape is a recursive process and, as such, is easy in a recursive computer language like LOGO. The listing at the end of this article contains a LOGO program that draws 12 separate fractals and other “monsters.” Figures 3 and 4 show two of the most “diabolical” designs.

Additional Reading

A great deal has been written about fractals in recent years. Several of the most interesting and informative articles and books are:

“An Interview with Benoit B. Mandlebrot,” Omni, September 1984.

Abelson and diSessa, *Turtle Geometry*, MIT Press, 1980 (Especially section 2.4, “Recursive Designs”).

Gardner, “Mathematical Games—”Monster” Curves,” Scientific American, December 1976.

Mandelbrot, *The Fractal Geometry of Nature*, W. H. Freeman, 1982.

McDermott, “Geometrical Forms Known as Fractals Find Sense in Chaos,” Smithsonian, December 1983.

Sorensen, “Fractals,” BYTE, September 1984.

Thornburg, *Discovering Apple LOGO—An Invitation to the Art and Pattern of Nature*, Addison-Wesley, 1983 (Especially Chapter XI—‘How Long is the Coast of California? Fractals and Recursion’).

You must have a copy of LOGO for the 64 to run this program.

Fractals in LOGO

```
TO START
   TEXTSCREEN
   CLEARTEXT
   PRINT [FRACTALS AND OTHER DIABOLICAL DESIGNS]
   PRINT []
   PRINT [ASSEMBLED BY DAVID MALMBERG]
   PRINT []
   PRINT [A - MANDELBROT'S DRAGON]
   PRINT [B - HILBERT'S CURVE]
   PRINT [C - SIERPINSKI'S CURVE]
   PRINT [D - ABELSON'S C CURVE]
   PRINT [E - KOCH'S SNOWFLAKE]
   PRINT [F - GOSPER'S FLOWSNAKE]
   PRINT [G - MANDELBROT'S SQUARE SNOWFLAKE]
   PRINT [H - ABELSON'S CORNERED POLYGONS]
   PRINT [I - MALMBERG'S WEAVE]
   PRINT [J - ABELSON'S NESTED TRIANGLES]
   PRINT [K - MANDELBROT'S HOOKED SNOWFLAKE]
   PRINT [L - MALMBERG'S MAZE]
   PRINT []
   PRINT1 ['ENTER CHOICE ']
   MAKE "KEY READCHARACTER
   IF :KEY = "A THEN DRAGON 6 10
   IF :KEY = "B THEN HIL 7 5
   IF :KEY = "C THEN SIERPINSKI 6 4
   IF :KEY = "D THEN C.CURVE 4 10
   IF :KEY = "E THEN KOCH 200 3
   IF :KEY = "F THEN GOSPER 200 3
   IF :KEY = "G THEN SQ.SNOW 140 2
   IF :KEY = "H THEN CORNER 80 144 10
   IF :KEY = "I THEN MAKE "X "FALSE WEAVE 250 2
   IF :KEY = "J THEN NEST 240 6
   IF :KEY = "K THEN HOOKSNOW 220 3
   IF :KEY = "L THEN MAKE "X "TRUE WEAVE 190 2
   START
END

TO START.DRAWING :X :Y
   CLEARTEXT
   CLEARSCREEN
   HIDETURTLE
   PENUP
   BACKGROUND 14
   PENCOLOR 6
   ( SPLITSCREEN 1 )
   HOME
   SETXY :X :Y
   PENDOWN
END

TO PRESS.RETURN
   PENUP
   CURSOR 0 24
   PRINT1 [PRESS RETURN TO DRAW ANOTHER CURVE]
   MAKE "KEY READCHARACTER
   START
END

TO DRAGON :SIZE :LEVEL
   START.DRAWING 80 ( - 30 )
   CURSOR 0 24 PRINT1 [MANDELBROT'S DRAGON]
   LDRAGON :SIZE :LEVEL
   PRESS.RETURN
END

TO LDRAGON :SIZE :LEVEL
   IF :LEVEL = 0 FORWARD :SIZE STOP
   LDRAGON :SIZE :LEVEL - 1
   LEFT 90
   RDRAGON :SIZE :LEVEL - 1
END

TO RDRAGON :SIZE :LEVEL
   IF :LEVEL = 0 THEN FORWARD :SIZE STOP
   LDRAGON :SIZE :LEVEL - 1
   RIGHT 90
   RDRAGON :SIZE :LEVEL - 1
END

TO HIL :SIZE :LEVEL
   START.DRAWING 70 ( - 110 )
   CURSOR 0 24 PRINT1 [HILBERT'S CURVE]
   HILBERT :SIZE :LEVEL 1
   PRESS.RETURN
END

TO HILBERT :SIZE :LEVEL :PARITY
   IF :LEVEL = 0 THEN STOP
   LEFT :PARITY * 90
   HILBERT :SIZE :LEVEL - 1 ( 0 - :PARITY )
   FORWARD :SIZE
   RIGHT :PARITY * 90
   HILBERT :SIZE :LEVEL - 1 :PARITY
   FORWARD :SIZE
   HILBERT :SIZE :LEVEL - 1 :PARITY
   RIGHT :PARITY * 90
   FORWARD :SIZE
   HILBERT :SIZE :LEVEL - 1 ( 0 - :PARITY )
   LEFT :PARITY * 90
END

TO SIERPINSKI :SIZE :LEVEL
   MAKE "DIAG :SIZE / SQRT 2
   START.DRAWING ( - 100 ) ( - 100 )
   CURSOR 0 24 PRINT1 [SIERPINSKI'S CURVE]
   REPEAT 4 [ONESIDE :LEVEL RIGHT 45 FORWARD
     :DIAG RIGHT 45]
   PRESS.RETURN
END

TO ONESIDE :LEVEL
   IF :LEVEL = 0 THEN STOP
   ONESIDE :LEVEL - 1
   RIGHT 45
   FORWARD :DIAG
   RIGHT 45
   ONESIDE :LEVEL - 1
   LEFT 90
   FORWARD :SIZE
   LEFT 90
   ONESIDE :LEVEL - 1
   RIGHT 45
   FORWARD :DIAG
   RIGHT 45
   ONESIDE :LEVEL - 1
END

TO C.CURVE :SIZE :LEVEL
   START.DRAWING ( - 70 ) ( - 40 )
   CURSOR 0 24 PRINT1 [ABELSON'S C CURVE]
   C :SIZE :LEVEL
   PRESS.RETURN
END

TO C :SIZE :LEVEL
   IF :LEVEL = 0 THEN FORWARD :SIZE STOP
   C :SIZE :LEVEL - 1
   RIGHT 90
   C :SIZE :LEVEL - 1
   LEFT 90
END

TO KOCH :SIZE :LEVEL
   START.DRAWING ( - 80 ) ( - 80 )
   CURSOR 0 24 PRINT1 [KOCH'S SNOWFLAKE]
   REPEAT 3 [SIDE :SIZE :LEVEL RIGHT 120]
   PRESS.RETURN
END

TO SIDE :SIZE :LEVEL
   LOCAL "UNIT
   IF :LEVEL = 0 THEN FORWARD :SIZE STOP
   MAKE "UNIT :SIZE / 3
   SIDE :UNIT ( :LEVEL - 1 )
   LEFT 60
   SIDE :UNIT ( :LEVEL - 1 )
   RIGHT 120
   SIDE :UNIT ( :LEVEL - 1 )
   LEFT 60
   SIDE :UNIT ( :LEVEL - 1 )
END

TO GOSPER :SIZE :LEVEL
   MAKE "G.SEGMENT 1 / ( SQRT 7 )
   START.DRAWING 0 ( - 110 )
   CURSOR 0 24 PRINT1 [GOSPER'S FLOWSNAKE]
   RGOSPER :SIZE :LEVEL
   PRESS.RETURN
END

TO RGOSPER :SIZE :LEVEL
   LOCAL "UNIT
   IF :LEVEL = 0 THEN FORWARD :SIZE STOP
   MAKE "UNIT :SIZE * :G.SEGMENT
   RIGHT 75
   LGOSPER :UNIT ( :LEVEL - 1 )
   LEFT 60
   RGOSPER :UNIT ( :LEVEL - 1 )
   RGOSPER :UNIT ( :LEVEL - 1 )
   LEFT 120
   RGOSPER :UNIT ( :LEVEL - 1 )
   LEFT 60
   LGOSPER :UNIT ( :LEVEL - 1 )
   RIGHT 120
   LGOSPER :UNIT ( :LEVEL - 1 )
   RIGHT 60
   RGOSPER :UNIT ( :LEVEL - 1 )
   LEFT 15
END

TO LGOSPER :SIZE :LEVEL
   LOCAL "UNIT
   IF :LEVEL = 0 THEN FORWARD :SIZE STOP
   MAKE "UNIT :SIZE * :G.SEGMENT
   RIGHT 15
   LGOSPER :UNIT ( :LEVEL - 1 )
   LEFT 60
   RGOSPER :UNIT ( :LEVEL - 1 )
   LEFT 120
   RGOSPER :UNIT ( :LEVEL - 1 )
   RIGHT 60
   LGOSPER :UNIT ( :LEVEL - 1 )
   RIGHT 120
   LGOSPER :UNIT ( :LEVEL - 1 )
   LGOSPER :UNIT ( :LEVEL - 1 )
   RIGHT 60
   RGOSPER :UNIT ( :LEVEL - 1 )
   LEFT 75
END

TO SQ.SNOW :SIZE :LEVEL
   START.DRAWING ( - 100 ) ( - 60 )
   CURSOR 0 24 PRINT1 [MANDELBROT'S SQUARE
     SNOWFLAKE]
   REPEAT 4 [EDGE :SIZE :LEVEL RIGHT 90]
   PRESS.RETURN
END

TO EDGE :SIZE :LEVEL
   LOCAL "UNIT
   IF :LEVEL = 0 THEN FORWARD :SIZE STOP
   MAKE "UNIT :SIZE / 4
   EDGE :UNIT ( :LEVEL - 1 )
   LEFT 90
   EDGE :UNIT ( :LEVEL - 1 )
   RIGHT 90
   EDGE :UNIT ( :LEVEL - 1 )
   RIGHT 90
   EDGE :UNIT ( :LEVEL - 1 )
   EDGE :UNIT ( :LEVEL - 1 )
   LEFT 90
   EDGE :UNIT ( :LEVEL - 1 )
   LEFT 90
   EDGE :UNIT ( :LEVEL - 1 )
   RIGHT 90
   EDGE :UNIT ( :LEVEL - 1 )
END

TO CORNER :SIZE :ANGLE :L
   MAKE "LIMIT :L
   START.DRAWING 0 ( - 30 )
   CURSOR 0 24 PRINT1 [ABELSON'S CORNERED POLYGONS]
   CORNERPOLY :SIZE :ANGLE 0
   PRESS.RETURN
END

TO CORNERPOLY :SIZE :ANGLE :TOTALTURN
   IF :SIZE ( :LIMIT THEN STOP
   CORNERPOLYSTEP :SIZE :ANGLE
   MAKE "TOTALTURN :TOTALTURN + :ANGLE
   IF NOT ( ( REMAINDER :TOTALTURN 360 ) = 0 )
      THEN CORNERPOLY :SIZE :ANGLE :TOTALTURN
END

TO CORNERPOLYSTEP :SIZE :ANGLE
   FORWARD :SIZE
   CORNERPOLY ( :SIZE / 2 ) ( 0 - :ANGLE ) 0
   RIGHT :ANGLE
END

TO WEAVE :SIZE :LEVEL
   MAKE "PARITY ( - 1 )
   START.DRAWING 0 ( - 120 )
   CURSOR 0 24
   IF NOT :X THEN PRINT1 [MALMBERG'S WEAVE]
   IF :X THEN PRINT1 [MALMBERG'S MAZE]
   MAZE :SIZE :LEVEL
   PRESS.RETURN
END

TO MAZE :SIZE :LEVEL
   LOCAL "UNIT
   IF :LEVEL = 0 THEN INTERIOR :SIZE STOP
   MAKE "UNIT :SIZE / 3
   MAZE :UNIT :LEVEL - 1
   LEFT 90
   MAZE :UNIT :LEVEL - 1
   REPEAT 3 [RIGHT 90 MAZE :UNIT :LEVEL - 1]
   REPEAT 3 [LEFT 90 MAZE :UNIT :LEVEL - 1]
   RIGHT 90
   MAZE :UNIT :LEVEL - 1
END

TO INTERIOR :SIZE
   MAKE "PARITY ( 0 - :PARITY )
   MAKE "UNIT :SIZE / 5
   IF :X THEN MAKE "PARITY 1 LEFT 45
   FORWARD 4 * :UNIT
   RIGHT 90 * :PARITY
   FORWARD 3 * :UNIT
   RIGHT 90 * :PARITY
   FORWARD 2 * :UNIT
   RIGHT 90 * :PARITY
   FORWARD :UNIT
   RIGHT 90 * :PARITY
   FORWARD :UNIT
   LEFT 90 * :PARITY
   FORWARD :UNIT
   LEFT 90 * :PARITY
   FORWARD 2 * :UNIT
   LEFT 90 * :PARITY
   FORWARD 3 * :UNIT
   LEFT 90 * :PARITY
   FORWARD 4 * :UNIT
   LEFT 90 * :PARITY
   FORWARD 4 * :UNIT
   RIGHT 90 * :PARITY
   IF :X THEN RIGHT 90 FORWARD 4 * :UNIT LEFT 45
END

TO NEST :SIZE :LEVEL
   START.DRAWING ( - 100 ) ( - 115 )
   CURSOR 0 24 PRINT1 [ABELSON'S NESTED TRIANGLES]
```

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```
   NESTEDTRIANGLE :SIZE :LEVEL
   PRESS.RETURN
END

TO NESTEDTRIANGLE :SIZE :LEVEL
   IF :LEVEL = 0 THEN STOP
   REPEAT 3 [NESTEDTRIANGLE :SIZE / 2 :LEVEL -
     1 FORWARD :SIZE RIGHT 120]
END

TO HOOKSNOW :SIZE :LEVEL
   START.DRAWING 80 ( - 110 )
   CURSOR 0 24 PRINT1 [MANDELBROT'S
     HOOKED SNOWFLAKE]
   RSNOW :SIZE :LEVEL
   PRESS.RETURN
END

TO RSNOW :SIZE :LEVEL
   LOCAL "UNIT
   LOCAL "SUNIT
   IF :LEVEL = 0 THEN FORWARD :SIZE STOP
   MAKE "UNIT :SIZE / 3
   MAKE "SUNIT :SIZE * 2 * ( SIN 60 ) / 9
   LEFT 60
   LSNOW :UNIT :LEVEL - 1
   RSNOW :UNIT :LEVEL - 1
   RIGHT 60
   RSNOW :UNIT :LEVEL - 1
   RIGHT 60
   RSNOW :UNIT :LEVEL - 1
   RIGHT 150
   RSNOW :SUNIT :LEVEL - 1
   LSNOW :SUNIT :LEVEL - 1
   LEFT 60
   RSNOW :SUNIT :LEVEL - 1
   LEFT 60
   LSNOW :SUNIT :LEVEL - 1
   RSNOW :SUNIT :LEVEL - 1
   LEFT 90
   LSNOW :UNIT :LEVEL - 1
   RSNOW :UNIT :LEVEL - 1
END

TO LSNOW :SIZE :LEVEL
   LOCAL "UNIT
   LOCAL "SUNIT
   IF :LEVEL = 0 THEN FORWARD :SIZE STOP
   MAKE "UNIT :SIZE / 3
   MAKE "SUNIT :SIZE * 2 * ( SIN 60 ) / 9
   LSNOW :UNIT :LEVEL - 1
   RSNOW :UNIT :LEVEL - 1
   RIGHT 90
   LSNOW :SUNIT :LEVEL - 1
   RSNOW :SUNIT :LEVEL - 1
   RIGHT 60
   LSNOW :SUNIT :LEVEL - 1
   RIGHT 60
   RSNOW :SUNIT :LEVEL - 1
   LSNOW :SUNIT :LEVEL - 1
   LEFT 150
   LSNOW :UNIT :LEVEL - 1
   LEFT 60
   LSNOW :UNIT :LEVEL - 1
   LEFT 60
   LSNOW :UNIT :LEVEL - 1
   RSNOW :UNIT :LEVEL - 1
   RIGHT 60
END
```

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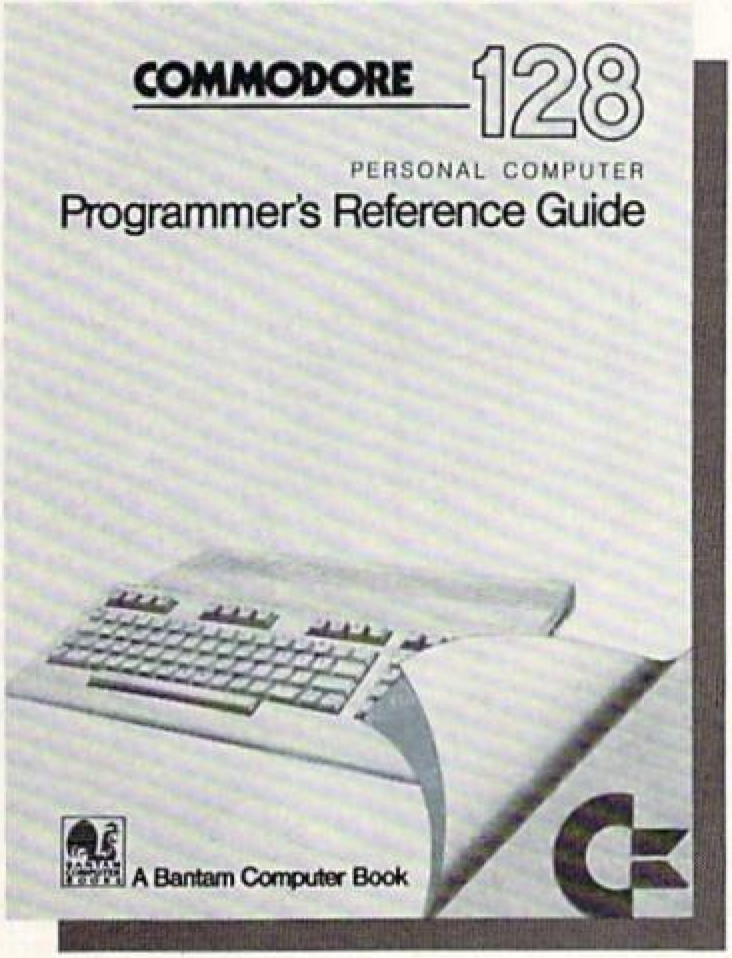

COMMODORE 128

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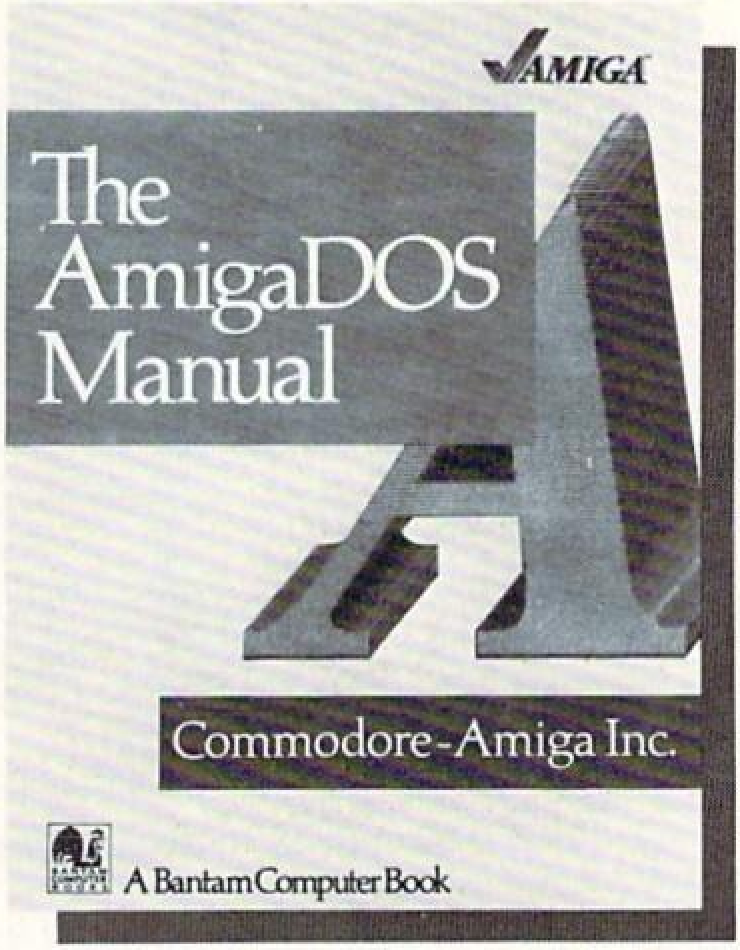

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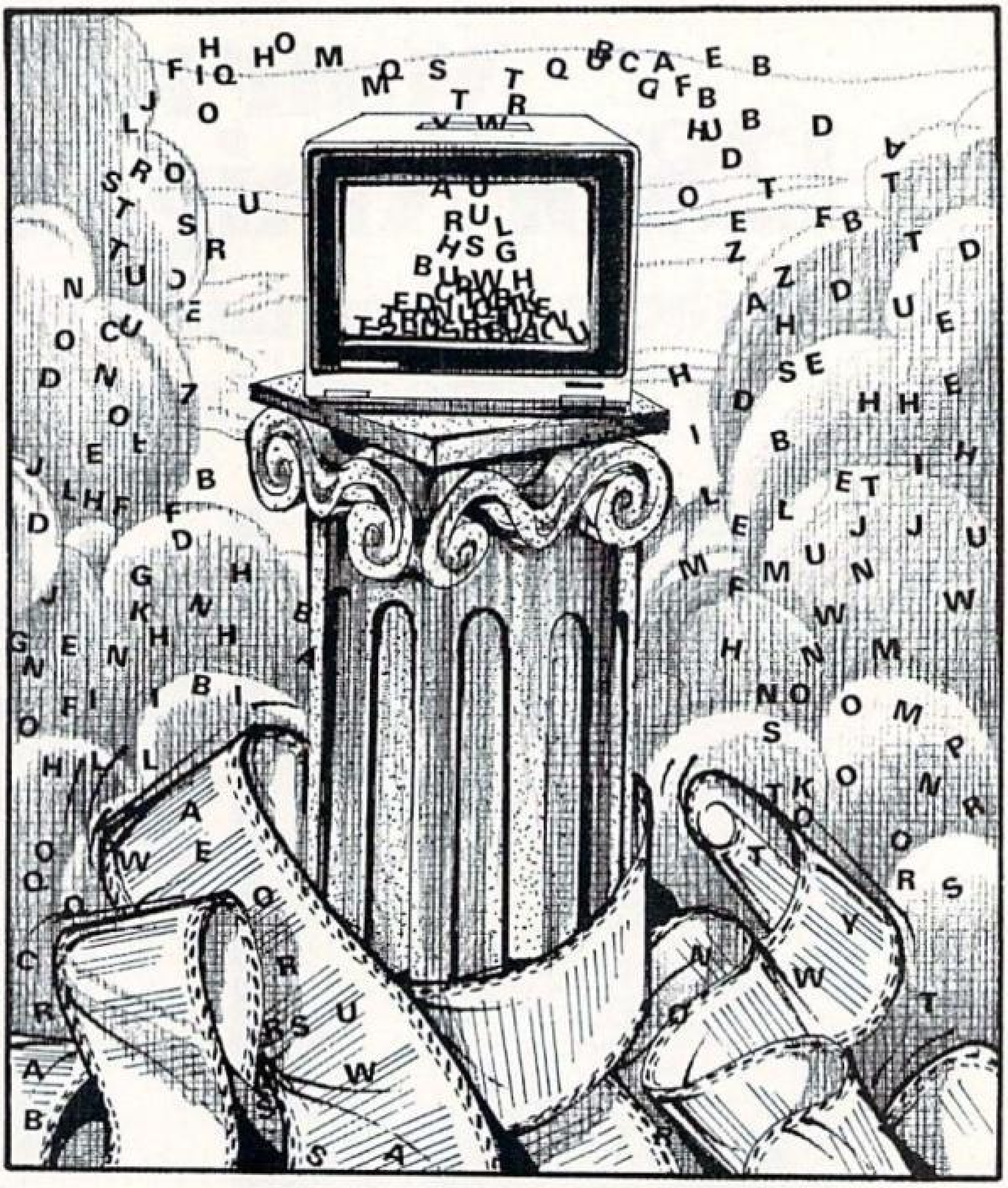
BY MARK JORDAN

ArcheType

A Word Processor for the 128 Part 2: Enhancements

Part 1, the basic ArcheType word processor, appeared in the May/June issue of Commodore Microcomputers. *This issue we add all the enhancements you've come to expect in a full-featured word processor — headers, footers, justification, printer control codes and more.*



One month has passed since the first installment of ArcheType and you're likely getting anxious to start using those "enhancements" that were promised. Well, they're here. Type them in and let's get started.

In this part of the program, function keys 7 and 8 have now been defined. Key 7 ranges text you wish to delete or copy. Press it, then use the cursor keys to highlight the area of text you want altered. The highlighting makes use of the 128's color by leaving reversed green text in the cursor's trail. If you want to delete it, press D. If, instead, you wish to store (copy) it in the large buffer, press S. The text will un-highlight and you'll be ready to type again.

When you use these functions, you can copy up to two screens into the buffer. Also, the cursor left and right keys will stop at the top left and bottom right of the screen, requiring you to use the up-down cursor keys to scroll the screen.

Function key 8 is the paste key. Any text that you store or delete using key 7 can be pasted anywhere in the text by pressing F8. It will be formatted as it appears.

Don't worry about remembering these commands. ArcheType will help you in two ways. One, the title bar will prompt you in many situations. Two, a help screen listing all the commands in living color will appear whenever you press HELP. I hope you get a chance to view this on a color RGBI monitor like the 1902. The colors are wonderful.

Additional commands let you search and replace text, set margins and underline.

Along with the block moves shown above, perhaps the next most convenient feature of a word processor is the search-and-replace command. ArcheType gives you several methods to perform this function. If you just wish to search the document, press Commodore-S. The title bar will ask you to type in the phrase you want to find. Terminate your phrase with a RETURN. When the phrase is found, it will be highlighted in red. If you want to stop there, press X and you'll find your cursor on the word or phrase you've found. If you wish to find the next occurrence, press any other key.

Replace is accessed by pressing Commodore-R. You'll be prompted to input the search phrase as above, but following that you'll be asked for the replace phrase. Then you'll need to choose whether or not you want all occurrences to be changed. If you choose N for not, the computer will allow you to pick and choose which occurrences you want to replace.

One last note about both these commands: they are case-sensitive. This means that if you search for the word "Boat," it will not find "boat." To find all occurrences of the word boat, both capitalized and not, either search for "oat" or run the search twice.

One control command has been added—Control-C. Put your cursor anywhere on any line you want centered, press Control-C and the line will automatically center. Don't worry about the graphic character that you'll see on the left margin. It won't print. It's there so that if you later reformat your document to different margins, your line will stay centered.

If you can't remember a command, press HELP for an instant reminder.

The last group of new commands are the control codes. Such things as headers, footers, margins, etc., fall into this category. To use them you need to use one of four keys.

Quick Reference Command Chart for ArcheType

Cursor Keys — move cursor directionally, one character
Clr/Home — move cursor to top of screen
Shift Clr/Home — move cursor to top of document
Inst/Del — delete character to left of cursor
Shift Inst/Del — insert space
English pound — play tune
Tab — move 5 spaces to the right
Shift Tab — move 5 spaces to the left
Escape — allows output of chr$(x)
Shift-Return — re-pastes one-line deletes
Help — get help screen

CONTROL +:

Cursor Keys — move cursor to directional extremes
B — move cursor to end of text
W — move cursor to previous screen
E — move cursor to next screen
P — begin printing subroutine
D — delete all characters to right of cursor
F — set position marker
G — goto screen number (of "f" to former position)
C — center line
English Pound — clear all text

FUNCTION KEYS:

1 — Insert mode
2 — Insert 5 lines
3 — Reformat paragraph from cursor
4 — Reformat entire document
5 — Load program
6 — Save program
7 — Range block, delete and copy
8 — Paste block

Up-arrow + control character. Follow with:

lm(xx) — left margin
rm(xx) — right margin
tm(xx) — top margin
bm(xx) — bottom margin
mr(xx) — margin release
in(xx) — indent
ss(xx) — spacing
jy/jn — justify on/off
nx — force page
h.(le/re/ce) — header aligned left, right, or centered
f.(le/re/ce) — footer " " " "
pn — print page number (use with header or footers)
Commodore key +: S = Search R = Replace D = Directory

The margins, spacing, justifications, header and footer controls are all accessed by pressing the up-arrow key then following it with the appropriate command. The command to change the left margin is "lm" followed by a number—whatever number you want the left margin to be. The right margin requires "rm," then its value. Change the top margin with "tm" and the bottom margin with "bm." Please note: The top and bottom margin numbers should be simply the number of lines down from the top and up from the bottom of the page you want your text to begin and end. Defaults for top and bottom are 5 lines. Defaults for left and right margins are 10 and 70, respectively.

You can easily change your margins within the text by adding an up-arrow line with the proper margin codes. You'll need to use the reformat option to initiate the change. If you wish to alter just one paragraph, place your cursor on the up-arrow control line and press F3. If you want to reconfigure the entire document, press F4 (see Part 1 and/or the accompanying chart for more on F1 through F6).

I should mention at this point that your text will always line up on the left edge of your screen whenever you are working on it. However, it will go only as far right as your preset margin values allow. This means that, for all practical purposes, each line you see on the screen is what you'll see on paper. To get a more exact view of how your paper will look, use the preview option mentioned in Part 1. Press Control-P to begin previewing.

You can release the left margin for the following line with an up-arrow "mr" followed by however many spaces you want it released. For example, if your left margin is 10 and you want it offset 4 (which would be an absolute margin of 6), you'll need a value of 4. If you want to indent a passage, follow the up-arrow with "in" and the number of spaces you want to indent relative to your left margin. This is the exact reverse of "mr" except that text will stay indented until you shut it off with an "in0."

Other up-arrow commands include "jy" to justify, and "jn" to turn justification off. To force a page to end at any given line, use "nx" (no followup value required).

Here's an example of a control line you might like at the top of a document:

↑ lm5 ↑ rm75 ↑ jy ↑ ss2 ↑
tm4 ↑ bm4

Each up-arrow initiates a new control command. The first sets the left margin to 5, then the right margin is set to 75, justification is turned on, double spacing is selected, and the top and bottom margins are set for 4 lines.

Finally, you can create one-line headers and footers via the up-arrow route. For a header, press up-arrow "h." followed by either "le" (for aligned on the left edge), "re" (aligned on the right edge), or "ce" (for a centered header). Follow these with the text you want in the header. If you desire automatic page numbering, you'll need to follow your header text with another up-arrow then "pn". And if you want the header to appear on page one as well as succeeding pages, place it on the very top line of your document.

An example is in order.

↑ h.re Jordan - ↑ pn

This will cause Jordan - (page number) to be printed at the right margin of each page.

Footers work exactly like headers except that you type "f." instead of "h." and they occur at the bottom of the page. Automatic paging works on footers, too.

Function key 7 lets you delete or copy text, while function key 8 lets you paste that text elsewhere in the document.

Please note: You must use the up-arrow as the first character on the line. You can, however, stack as many up-arrows as you wish on one line.

The second control character is for accessing special features on your printer. To use these functions, press the escape key. Each time you do you'll see a checkerboard character on the screen. Follow this with whatever chr$ value your printer requires to perform the operation you want. If you're familiar with the codes for accessing your printer's special features, this command is the key to accessing them. For example, ▒ 27E will send chr$(27)"E" to the printer, which puts many printers into the enhanced-printing mode. Your printer's control codes should be detailed in its manual.

The last control character I put into ArcheType is an underliner. Press shift-@ and you'll see an underline marker on the screen. Whatever follows will be underlined. To shut off the underline, press shift-@ again. This command was specifically designed for the printer I have (Gemini-10X). If it doesn't work for you, you can modify line 955 to match your printer's specifications.

One last point about formatting. Since ArcheType reformats the screen with control characters and all, it would appear you are somewhat limited in using it to its fullest. But there is a simple way around these limitations. Simply reformat your document before putting in any special character codes, then go back through it and insert them manually using the insert/delete key. This way, your margins will not be fouled up.

This same idea can be applied when you want to print a document with, say, 100 characters (condensed mode) in a line. Simple wait until you get ready to print, place your new margin settings in the document, then choose the reformat option after pressing Control-P. It will print up to 255 character lines this way, though you won't be able to preview them. Also, be aware that after reformatting in this way, you'll need to re-reformat if you want to go back and edit the line further. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

ArcheType Enhancements

```
1045 REM ----- WINDOW DRESSING'BTQH
1050 GOSUB 655:CHAR 0,CP,C-TS,"":A$=""
     :C2$=MID$(A$(C),CP+1,1)
     :RETURN'IJDK
1055 REM ----- BLOCK DELETES AND
     MOVES'BALK
1060 C3$=C2$:CP=POS(0):CY=C:TY=TS
     :C9=CP:XP=CP+1:BL=C*80+CP:BE=BL
     :RL=0:LB=0:IF XP>LEN(A$(C))THEN
     A$(C)=A$(C)+" "'UXNF
1065 IN$="[RVS,PURPLE] [SHFT P]RESS
     [SHFT D] TO DELETE, [SHFT S]
      TO STORE AND EXIT [RVOFF,GRAY3]"
     :GOSUB 1050:C2$=C3$'DPIW
1070 DO UNTIL A$="D"OR A$="S"'FESF
1075 GET KEY A$:PC=PEEK(212):A=ASC(A$)
     :A1$=A$'HWGO
1080 ON K(A) GOSUB 1095,1135,1105,
     1180,1215'CDHH
1085 LOOP:CP=POS(0)+1'EHCK
1090 BE=C*80+CP+RL:GOSUB 1310:C=C2
     :IF A$="S"THEN GOSUB 1290
     :ELSE GOSUB 1260'MFRQ
1095 RETURN'BAQH
1100 REM ----- BLOCK DOWN'BOTX
1105 DO:CP=POS(0)+1:IF C=D THEN
     RETURN'IKCG
1110 UD=-1:RV$="[RVS,GREEN]"
     :IF C<CY THEN RV$="[RVOFF,GRAY3]
     "'HOKE
1115 PRINT RV$MID$(A$(C),CP)L$;'CQBE
1120 IF C=TS+23 THEN PRINT"[RVOFF,
     GRAY3]"A$(C+1)J$;:TS=TS+1'IUEH
1125 GOTO 1155'BEJC
1130 REM ----- BLOCK UP'BMCA
1135 DO:CP=POS(0)+1:IF C=0 THEN
     RETURN'IKHJ
1140 IF C=TS THEN PRINT IL$G$A$(C-1)"
     [DOWN]"J$TAB(CP);:TS=TS-1'IBRJ
1145 UD=1:RV$="[RVS,GREEN]"
     :IF C>CY THEN RV$="[RVOFF,GRAY3]
     "'GONM
1150 PRINT RV$C2$O$J$RV$LEFT$(A$(C),
     CP)A$J$RV$A$(C-1)J$;'DOCJ
1155 C=C-UD:IF A$(C)=""THEN A$(C)="
     "'GPSL
1160 IF C=CY THEN PRINT
     J$A$(C)J$TAB(XP-1)Y$C3$"[LEFT]";
     'GWMJ
1165 C2$=MID$(A$(C),POS(0)+1,1)
     :IF C2$=""THEN C2$=" "'IYFP
1167 PRINT O$Y$C2$G$;:LOOP WHILE
     PEEK(212)=PC'FSPO
1170 RL=0:POKE 208,0:RETURN'DKPF
1175 REM ----- BLOCK LEFT'BOGK
1180 DO:CP=POS(0)+1:IF CP=1 AND C=TS
     THEN RETURN'KOHM
1185 CO$="":IF C*80+CP-2<BL THEN
     CO$="[RVS,GREEN]"'IPEQ
1190 C1$=C2$:CK$=A$+"[LEFT]"'DMUI
1195 IF CP>1 THEN C2$=MID$(A$(C),CP-1,
     1):GOTO 1240'HYKR
1200 C=C-1:C2$=RIGHT$(A$(C),1)
     :CK$="[UP]"+K$:IF C2$<>" "THEN
     CK$=CK$+A$'MJAL
1205 GOTO 1240'BEEB
1210 REM ----- BLOCK RIGHT'BPNA
1215 DO:CP=POS(0)+1:IF C=TS+23 OR C=D
     AND CP>LEN(A$(C))THEN RETURN'OYNQ
1220 CO$="":IF C*80+CP>BL THEN CO$="
     [RVS,GREEN]"'HOMF
1225 C1$=C2$:CK$=A$+"[LEFT]"'DMUH
1230 IF CP>LEN(A$(C))THEN C=C+1
     :CK$="[DOWN]"+J$:CP=0'JWMJ
1235 C2$=MID$(A$(C),CP+1,1)'DQKI
1240 IF C2$=""THEN C2$=" "'EGGC
1245 PRINT CO$C1$O$CK$Y$C2$G$;
     :LOOP WHILE PEEK(212)=PC'FCPN
1250 POKE 208,0:RETURN'CGJC
1255 REM ----- DELETE BLOCK'BQQJ
1260 A$(C)=LEFT$(A$(C),
     C3)+MID$(A$(C5),C6+1)'FCJJ
1265 IN$=N$:GOSUB 655:IF LB=0 THEN
     1280'FRLM
1270 FOR T=C+1 TO D:A$(T)=A$(T+LB)
     :NEXT:D=D-LB'JXUN
1275 IF C<TS THEN TS=C'EGGL
1280 GOSUB 780:RETURN'CESE
1285 REM ----- STORE BLOCK'BPDM
1290 IN$=N$:GOSUB 655:C2$=C3$
     :CHAR 0,0,C-TS,""'FAWM
1295 IF LB=0 THEN PRINT
     A$(C)J$TAB(C9)Y$C3$G$;
     :RETURN'GWKR
1300 FOR T=C TO C5-1:PRINT A$(T):NEXT
     :PRINT A$(T);:C=CY
     :CHAR 0,C9,C-TS,"":PRINT Y$C2$G$;
     :RETURN'MSPN
1305 REM ----- RANGE BLOCK'BPVF
1310 IF BL=>BE THEN T=BL:BL=BE-1
     :BE=T+1'JSNH
1315 C1=BL/80:C2=INT(C1):C3=BL-C2*80
     :C4=(BE-1)/80:C5=INT(C4)
     :C6=BE-C5*80:LB=INT(C5-C2)'SHQC
1320 IF LB=0 THEN ST$(0)=MID$(A$(C2),
     C3+1,C6-C3):RETURN'ICPI
1325 FOR T=0 TO LB:ST$(T)=A$(C2+T)
     :NEXT:ST$(0)=MID$(ST$(0),C3+1)
     :ST$(LB)=LEFT$(ST$(LB),C6)'LIRX
1330 RETURN'BAQY
1335 REM ----- INSERT BLOCK'BQAI
1340 CP=POS(0)+1:PRINT J$E$"@";'EMCF
1345 IF LB=0 THEN A$(C)=LEFT$(A$(C),
     CP-1)+ST$(0)+MID$(A$(C),CP)
     :GOTO 1370'KPAT
1350 ST$(LB+1)=MID$(A$(C),CP)'DSKH
1355 A$(C)=LEFT$(A$(C),CP-1)'DQML
1360 D=D+LB+2:FOR T=D TO C+LB+2 STEP-1
     :A$(T)=A$(T-LB-2):NEXT'ODOR
1365 FOR T=0 TO LB+1:A$(T+C+1)=ST$(T)
     :NEXT'IUXQ
1370 GOSUB 780:RETURN'CESE
1375 REM ----- SEARCH'BLML
1380 FZ=POS(0):PRINT C2$:CG=C
     :WINDOW 0,0,79,0:PRINT"[CLEAR,
     RVS,BROWN] [SHFT S]EARCH FOR
     [RVOFF]:";:GOSUB 1475
     :SE$=IP$'IMCX
1385 RE=0:IF A=178 THEN PRINT"[CLEAR,
     RVS] [SHFT R]EPLACE WITH[RVOFF]
     :";:GOSUB 1475:RE$=IP$
     :RE=LEN(RE$):PRINT"[CLEAR,RVS]
     [SHFT R]EPLACE ALL? [RVOFF]
     [SHFT Y]/[SHFT N] ";
     :GET KEY RA$'MKAM
1390 SN$="[RVS,YELLOW] [SHFT P]RESS
     [SHFT X] TO EXIT, ANY KEY TO
     CONTINUE [RVOFF,GRAY3]"
     :SR$="[RVS,RED,SPACE14,SHFT S,
     SHFT E,SHFT A,SHFT R,SHFT C,
     SHFT H,SHFT I,SHFT N,SHFT G,
     SPACE15,RVOFF,GRAY3]"
     :RT$="[RVS,WHITE,SPACE5,SHFT R]
     EPLACE[SPACE2,SHFT Y]/[SHFT N,
     SPACE2](OR [SHFT X] TO EXIT)
     [SPACE5,RVOFF,GRAY3]"'DLIV
1395 S=22:PRINT CL$:IN$=SR$
     :GOSUB 655'ESWQ
1400 DO:IF C>D THEN 1455'EHSB
1405 PS=INSTR(A$(C),SE$,PS+1)
     :IF PS=0 THEN C=C+1:LOOP'JAVO
1410 FZ=PS-1:CG=C:IF C>TS+23 THEN
     TS=C-10:GOSUB 375:C=CG
     :PRINT C2$;'MIOO
1415 CHAR 0,PS-1,C-TS,""
     :PRINT"[RVS,RED]"SE$G$;'ERLK
1420 IF RE=0 THEN BEGIN:IN$=SN$
     :GOSUB 655:GET KEY A$
     :IF A$="X"THEN 1455'LATM
1425 BEND:GOTO 1405'CGNG
1430 IF RA$<>"Y"THEN BEGIN:IN$=RT$
     :GOSUB 655:GET KEY A$
     :IF A$="X"THEN 1455'MAUO
1435 BEND:IF A$<>"Y"THEN 1405'FILK
1440 A$(C)=LEFT$(A$(C),
     PS-1)+RE$+MID$(A$(C),PS+LEN(SE$))
     :CHAR 0,0,C-TS,"":PRINT HA$A$(C);
     'LDBU
1445 IF LEN(A$(C))>79 THEN GOSUB 780
```

```
     :PRINT C2$;'GRAN
1450 GOTO 1405'BEHD
1455 FZ=FZ+1'CFEJ
1460 C=CG:C2$=MID$(A$(C),FZ,1):IN$=N$
     :GOSUB 655:CHAR 0,FZ-1,C-TS,""
     :PRINT Y$C2$G$;'JYVU
1465 RETURN'BAQI
1470 REM ----- INPUTER'BMAH
1475 IP$=""'BDKK
1480 GET KEY I$:I=ASC(I$)
     :IF I=20 THEN IP$=LEFT$(IP$,
     ABS(LEN(IP$)-1)):PRINT I$;
     :GOTO 1480'ONJW
1485 IF I=13 THEN RETURN'EDFN
1490 IF I<32 OR I>127 AND I<160 THEN
     1480'HPEN
1495 PRINT I$;:IP$=IP$+I$
     :GOTO 1480'ERCR
1500 REM ----- CENTERING'BOPC
1505 X$=A$(C)'BHNF
1510 IF ASC(X$)=123 THEN LI=2:DO
     :XY$=MID$(X$,LI,1):LI=LI+1
     :LOOP UNTIL XY$<>" "
     :X$=MID$(X$,LI-1)'RUPW
1515 LF=LEN(X$):LG=INT((LC-LF)/2)'GSJM
1520 X$=CE$+MID$(N$,3,LG)+X$
     :IF RR=1 THEN RETURN'IUNJ
1525 PRINT J$HA$X$:A$=" ":A$(C)=X$
     :GOTO 165'EWVM
1530 REM ----- UP ARROW CODES'BROG
1535 UP=0:R=0'CGTI
1540 DO:UP=INSTR(PR$,"[UP ARROW]",
     UP+1):IF UP=0 THEN EXIT'IRAM
1545 TR$=MID$(PR$,UP+1,2)
     :MM$=MID$(PR$,UP+3,2)
     :MM=VAL(MM$)'IMMV
1550 IF TR$="MR"THEN MR=-MM'FHDI
1555 IF TR$="IN"THEN MR=MM'EHYN
1560 IF TR$="SS"THEN SS=MM'EHVJ
1565 IF TR$="JN"THEN JY$="N"'EGQO
1570 IF TR$="JY"THEN JY$="Y"'EGMK
1575 IF TR$="LM"THEN LM=MM
     :LC=RM-LM'GOOS
1580 IF TR$="RM"THEN RM=MM
     :LC=RM-LM'GOBO
1585 IF TR$="TM"THEN TM=MM'EHLQ
1590 IF TR$="BM"THEN BM=MM'EHAM
1595 IF TR$="NX"THEN SC=TE-T+1
     :T=TE'HNIU
1600 IF TR$="H."OR TR$="F."THEN BEGIN
     :HD$=MID$(PR$,UP+5)'JULL
1605 H$=MID$(PR$,UP+3,2):HS=LM'ESRL
1610 IF H$="RE"THEN HS=RM-LEN(HD$)
     'GLRH
1615 IF H$="CE"THEN HS=INT(((LC-LEN
     (HD$))/2)+LM)'JUNP
1620 BEND:IF TR$="F."THEN FT$=HD$
     :HD$="":FS=HS'HUFL
1625 UP=UP+3:LOOP'DGEJ
1630 LF=LC:LC=RM-LM:LF=LF-LC
     :RETURN'GTQL
1635 REM ----- JUSTIFY'BMHK
1640 X$=PR$:IF RIGHT$(A$(C),1)="
     [SHFT @]"OR C>D THEN RETURN'IRDM
1645 IF RIGHT$(X$,2)="[SPACE2]
     "THEN X$=LEFT$(X$,LEN(X$)-1)
     :GOTO 1645'JXGT
1650 IS=LC-LEN(X$):IF IS>0 THEN BEGIN
     :II=1:IC=0'JVJP
1655 DO UNTIL II>LC:IF MID$(X$,II,
     1)=" "THEN IC=IC+1'JTCU
1660 II=II+1:LOOP'DGOI
1665 IF IC<IS THEN 1690'DIUN
1670 IX=INT(IC/IS):II=1:IY=IX
     :IC=1'GVFP
1675 DO:II=INSTR(X$," ",II+2)
     :X$=LEFT$(X$,II)+" "+MID$(X$,
     II+1)'KFDA
1680 DO UNTIL IY=1:IY=IY-1
     :II=INSTR(X$," ",II+2):LOOP
     :IY=IX'KCJV
1685 IC=IC+1:LOOP UNTIL IC>IS'FKJS
1690 BEND:PR$=X$'CHSL
1695 PR$=X$:RETURN'CGMP
1700 REM ----- HELP SCREEN'BPNE
1705 CZ$=C2$:IP$="F":ZC=C:ZP=POS(0)+1
     :S=20:IN$="[RVS,GRAY2,SPACE8,
     SHFT P]RESS ANY KEY TO EXIT
     [SHFT H,SHFT E,SHFT L,SHFT P,
     SPACE6,RVOFF,GRAY3]"
     :GOSUB 655'JIJH
1710 PRINT CHR$(2)"[CLEAR,RED,SHFT U]
     P ARROW ([UP ARROW]
     ) IS A NON-PRINTING INDICATOR.",,
     "[LEFT2,SHFT P]RESENT"'CFJT
1715 PRINT CHR$(2)" [SHFT F]
     OLLOW WITH (OMIT BRACKETS)
     :",,,,"[LEFT2]VALUES:"'CHBU
1720 PRINT,"[WHITE]SS[XX][ORANGE]
      TO CHANGE SPACING[RVS]",,,
     SS'BGNL
1725 PRINT,"[WHITE]LM[XX][ORANGE]
      TO CHANGE LEFT MARGIN[RVS]",,,
     LM'BGTR
1730 PRINT,"[WHITE]RM[XX][ORANGE]
      TO CHANGE RIGHT MARGIN[RVS]",,,
     RM'BGPN
1735 PRINT,"[WHITE]TM[XX][ORANGE]
      TO CHANGE TOP MARGIN[RVS]",,,
     TM'BGDS
1740 PRINT,"[WHITE]BM[XX][ORANGE]
      TO CHANGE BOTTOM MARGIN[RVS]",,
     BM'BFCO
1745 PRINT,"[WHITE]MR[XX][ORANGE,
     SPACE2]TO CAUSE A MARGIN
     RELEASE"'BBPT
1750 PRINT,"[WHITE]IN[XX][ORANGE,
     SPACE2]TO CAUSE MARGIN TO
     INDENT"'BBRP
1755 PRINT,"[WHITE]JY[YS OR NO]
     [ORANGE] TO SET JUSTIFY[RVS]",,,
     JY$'BHVU
1760 PRINT,"[WHITE]NX[ORANGE]
      TO FORCE PRINTER TO NEXT
     PAGE"'BBBQ
1765 PRINT,"[RVS,GRAY3]H.[XX.TEXT]
```

```
     [GRAY2] FOR HEADER[SPACE4]/
     [SPACE4,GRAY3]F.[XX.TEXT][GRAY2]
      FOR FOOTER "'BBFD
1770 PRINT,"[RVS]XX= [GRAY3]CE[GRAY2]
      TO CENTER, [GRAY3]LE[GRAY2]
      TO ALIGN LEFT, [GRAY3]RE[GRAY2]
      TO ALIGN RIGHT "'BBLA
1775 PRINT CHR$(2)"[GREEN,SHFT F]
     UNCTION KEYS ARE:"'CDHT
1780 PRINT"[L. GREEN,SHFT F]-1 =
     [SHFT I]NSERT 1 LINE[SPACE3,
     SHFT F]-3 = [SHFT R]EFORMAT PARA
     [SPACE3,SHFT F]-5 = [SHFT L]
     OAD FILE[SPACE3,SHFT F]-7 =
     [SHFT R]ANGE BLOCK"'BAIG
1785 PRINT"[SHFT F]-2 = [SHFT I]
     NSERT 5 LINES[SPACE2,SHFT F]
     -4 = [SHFT R]EFORMAT ALL[SPACE4,
     SHFT F]-6 = [SHFT S]AVE FILE
     [SPACE3,SHFT F]-8 = [SHFT P]
     ASTE BLOCK"'BABL
1790 PRINT CHR$(2)"[L. BLUE,SHFT C]
     ONTROL FUNCTIONS ARE:"'CDLS
1795 PRINT"[CYAN] [SHFT W] = [SHFT P]
     REVIOUS SCREEN[SPACE2,SHFT E] =
     [SHFT N]EXT SCREEN[SPACE2,SHFT G]
      = [SHFT G]OTO SCREEN #[SPACE3,
     SHFT B] = [SHFT B]
     OTTOM OF TEXT"'BAEN
1800 PRINT" [SHFT D] = [SHFT D]
     ELETE LINE[SPACE6,SHFT C] =
     [SHFT C]ENTER LINE[SPACE2,SHFT P]
      = [SHFT P]REVIEW/[SHFT P]RINT
     [SPACE3,POUND] = [SHFT C]
     LEAR ALL TEXT"'BACY
1805 PRINT" [SHFT F] = [SHFT P]
     RESERVE POSITION (USE [SHFT C]
     ONTROL-[SHFT G] + [RVS]F[RVOFF]
      TO RETURN)"'BAKW
1810 PRINT CHR$(2)"[L. BLUE,SHFT C]
     OMMODORE KEY FUNCTIONS ARE
     : [RVS,YELLOW] [SHFT S] =
     [SHFT S]EARCH[SPACE3,SHFT R] =
     [SHFT R]EPLACE[SPACE3,SHFT D] =
     [SHFT D]IRECTORY"'CDYB
1815 PRINT"[BROWN,SHFT E]
     SCAPE YIELDS ([CMDR *]
     ) - FOLLOW WITH CHR$(VAL)","
     [BROWN,SHFT S,SHFT H,SHFT I,
     SHFT F,SHFT T]-[SHFT R,SHFT E,
     SHFT T,SHFT U,SHFT R,SHFT N]
      REPLACES DELETES"'BBRJ
1820 PRINT,,CHR$(15)"[SPACE2,L. RED,
     RVS] [SHFT P]RESS [RED] [SHFT H]
      [SHFT E] [SHFT L] [SHFT P]
     [L. RED] FOR [SHFT H]ELP [SHFT S]
     CREEN[GRAY3]"'CGDT
1825 GET KEY H$:GOTO 375'DGDL
```

END

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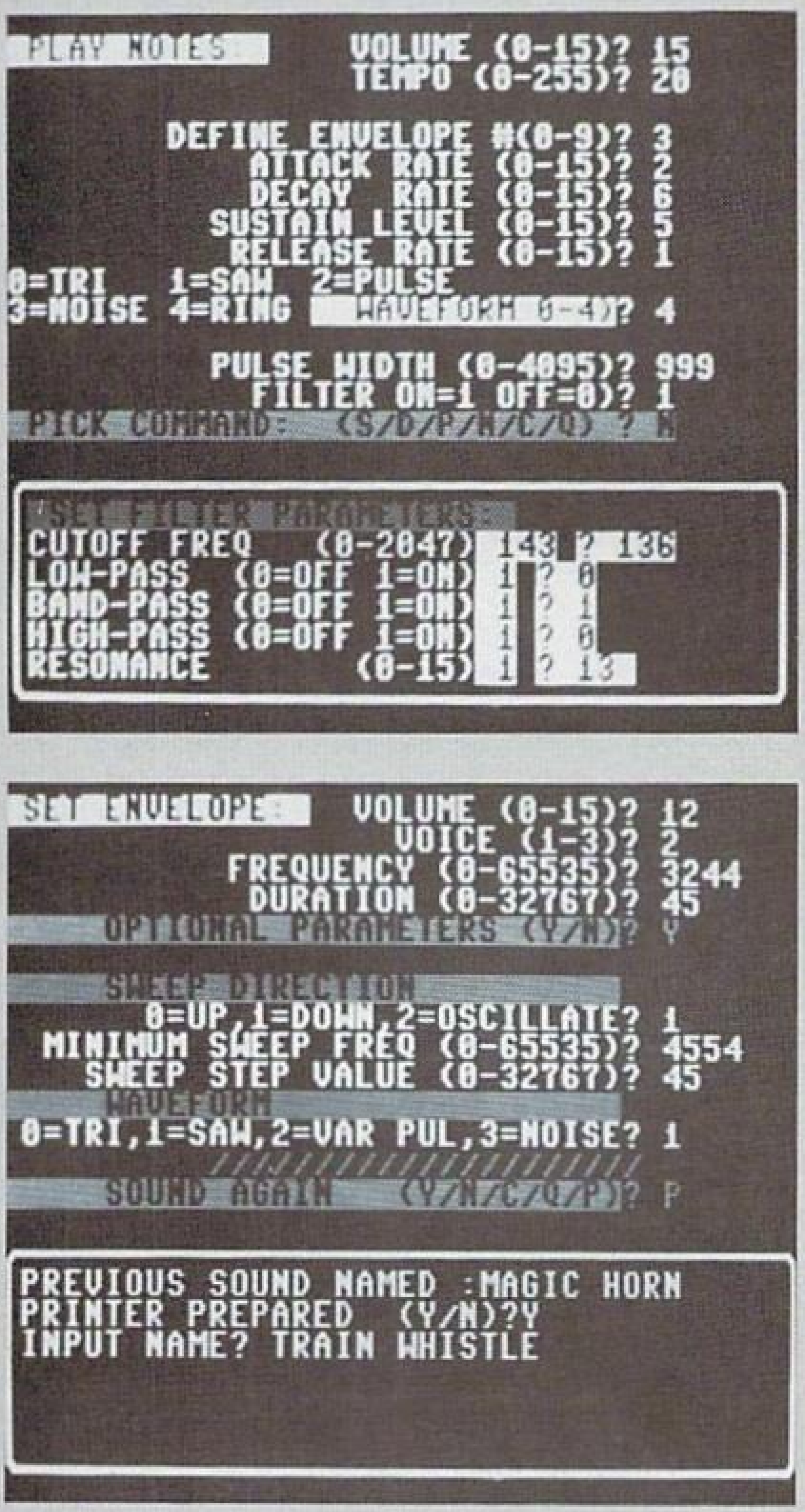
BY GARY FIELDS

Sound Advice

for the Commodore 128



```
PLAY NOTES        VOLUME (0-15)? 15
                   TEMPO (0-255)? 20

           DEFINE ENVELOPE #(0-9)? 3
                 ATTACK RATE (0-15)? 2
                 DECAY  RATE (0-15)? 6
               SUSTAIN LEVEL (0-15)? 5
                RELEASE RATE (0-15)? 1
0=TRI    1=SAW  2=PULSE
3=NOISE 4=RING     WAVEFORM 0-4)? 4

             PULSE WIDTH (0-4095)? 999
               FILTER ON=1 OFF=0)? 1
PICK COMMAND:   (S/D/P/N/C/Q) ? N

 SET FILTER PARAMETERS:
CUTOFF FREQ    (0-2047) 143 ? 136
LOW-PASS   (0=OFF 1=ON) 1 ? 0
BAND-PASS (0=OFF 1=ON) 1 ? 1
HIGH-PASS (0=OFF 1=ON) 1 ? 0
RESONANCE         (0-15) 1 ? 13

SET ENVELOPE:     VOLUME (0-15)? 12
                    VOICE (1-3)? 2
            FREQUENCY (0-65535)? 3244
             DURATION (0-32767)? 45
     OPTIONAL PARAMETERS (Y/N)? Y

     SWEEP DIRECTION
      0=UP,1=DOWN,2=OSCILLATE? 1
 MINIMUM SWEEP FREQ (0-65535)? 4554
    SWEEP STEP VALUE (0-32767)? 45
     WAVEFORM
0=TRI,1=SAW,2=VAR PUL,3=NOISE? 1
          ////////////////////////
     SOUND AGAIN    (Y/N/C/Q/P)? P

PREVIOUS SOUND NAMED :MAGIC HORN
PRINTER PREPARED  (Y/N)?Y
INPUT NAME? TRAIN WHISTLE
```

Create sound effects to use in your programs, or play your 128 like an instrument, using this program.

The sound barrier can be broken. All it takes is your Commodore 128 and a friendly sound editor like "Sound Advice."

When the 128's sister, the Commodore 64 was introduced in 1982, you had to manipulate a never-ending series of POKEs in order to produce sound. Only the most patient programmer would dig through this maze of POKEs in order to bring up the motherlode of sound. Everyone knew the sound was there, three voices rich, but it wasn't easy to reach.

That all changed with the Commodore 128 and BASIC 7.0. Those confusing POKE statements are replaced with less cryptic statements like SOUND, ENVELOPE, VOL, TEMPO, PLAY and FILTER. While a misdirected POKE on the 64 could bury your program deep in the mysteries of the 6510 microprocessor, never to return, an error in the BASIC 7.0 sound statements usually ends with an easy to fix "SYNTAX ERROR IN LINE #" prompt.

The easiest way to stir the sound in your 128 is to PLAY a few notes. To do that, first set the volume (the VOL statement) and then PLAY the notes, using a program like this:

```
10 VOL 15
20 PLAY "ABCDEFG"
```

When you issue the RUN command, your 128 should respond by sounding the musical notes "ABCDEFG" using the piano (the default instrument) envelope with maximum volume (15).

But if you want more sound and more control, a few other statements must be issued. For instance, if you want to vary the speed at which notes are played, you need to include a TEMPO statement. (The 128's default TEMPO setting is 8, about 2.4 seconds.)

If you want to play different instruments, you can either select one of the ten predefined instruments (piano is 0, a xylophone is 9) or create your own using the ENVELOPE statement, which lets you specify the properties the musical instrument will possess.

If you want to create unique, never-before-heard sound effects, use the powerful SOUND statement.

The FILTER statement is used to perfect synthesized sounds. This statement increases both the sharpness and quality of sound.

A Sound Editor for the 128

Sound Advice is a sound editor which will make getting these precise sounds out of your 128 and into your living room as easy as pressing RETURN. It will also tell you what statements to use to duplicate the sounds in your own programs (including line numbers and notes).

Before I describe the program, let me assure you that you need know nothing about BASIC 7.0, SID (the Sound Interface Device), things like frequencies, waveforms, filters or even music to use Sound Advice. All you must have is an ear that can hear. Using the program is simple. You input numbers, press RETURN and hear what effect that number, when introduced in the correct memory location, has on sound quality. And don't worry, the program is designed to prevent you from breaking anything or inputting illegal values.

NOTE: In order to make it possible

to simply press RETURN and retain a value, Sound Advice uses the INPUT statement instead of the more controllable GET statement. Thus, the cursor-control keys (CRSR) are not disabled. So it's possible to scramble the screen display by using the up/down cursor keys. If that happens, don't panic, simply bring the cursor to its proper location and press RETURN. If you forget and press RETURN before repositioning the cursor, just repeatedly press C (for clear) followed by RETURN until the screen clears and the program restarts.

Sound Advice is actually two programs. Both allow you to create, test and print sound effects. One makes creating sound effects easy, while the other lets you create a unique musical instrument by redesigning one of the 128's ten envelopes. Then you can play notes simply by pressing the keyboard. When you finally get the sound you want, Sound Advice will download the statements, including parameters, to your printer. To include the sound effects or music in your own programs, all you need do is type the listing your printer produces into your own BASIC programs.

After duplicating the Sound Advice listing, you should save it before issuing the RUN command. You'll also need a printer, if you plan to download information.

NOTE: I tried to use as much of the new BASIC 7.0 as possible for those of you who are interested in programming yourself. BASIC 7.0 statements included (other than the sound statements) are WINDOW, IF/BEGIN/BEND loops, SLEEP, COLOR and GETKEY.

The Title Page

When you first run Sound Advice, you'll be in for a sound treat. While the title is displayed, the 128 randomly selects SOUND and PLAY parameters and goes into a never-ending loop of sounds and musical notes for you to enjoy while you decide whether to continue or quit. To quit, simply press Q.

To create a special sound effect, like a laser gun or telephone ringing, you should press E (for Envelope). If you're more interested in playing musical notes, press P (for PLAY) instead.

> *You need know nothing about BASIC 7.0, SID (the Sound Interface Device), things like frequencies, waveforms, filters or even music to use Sound Advice. All you must have is an ear that can hear.*

Envelope: Creating Sound Effects

Let's describe the Envelope portion of Sound Advice first.

The Envelope screen will ask you to set some important parameters. See Table A for example responses for this screen. When the screen asks you to set the optional parameters, a Y (the default value) will appear. If you press N (for No) and press RETURN, the SOUND AGAIN line will appear and you should hear your sound effect. (Make sure the volume on your monitor is turned up so you can hear sounds.) Now you have several choices. You can press Y for "Yes, sound it again," N for "No, don't sound it again," C for "Clear the screen," Q for "Quit," or P for "Print information."

Pressing N and RETURN will cause the cursor to jump back up to "VOLUME?" Now you can change the sound effect's quality by typing in different numbers. Just press RETURN if you want to retain the present value parameter. Continue until you get to the OPTIONAL PARAMETER prompt. If you want to set the OPTIONAL PARAMETERS, just press RETURN to accept the default value of Y, meaning, "Yes, I want to set the optional paraameters."

Look at Table B, which shows the new parameters you can adjust. For now, input any number after each prompt. As you experiment, you will hear how a change in each parameter affects the overall sound quality. The program will not let you enter illegal values. When you get to the WAVEFORM prompt, you have a choice of four values. If you select 0, 1, or 3, you'll hear the new sound effect. If you select 2, which activates Variable Pulse, you must also set the Pulse Width sound (see Table C). After you press RETURN your new sound effect will be heard.

Now you again have the choices of either hearing the sound again, dumping the information to printer, defining another sound effect, etc.

P: Print Envelope

When you select P (for Print), a window will open near the bottom of the screen. This area is used to answer prompts in order to dump the information to your printer. Tables A, B and C were printed out using this option.

Q: Quit

When you finally decide to quit, press Q while at the SOUND AGAIN line. The program will ask if you are sure. Answer Y if you are. Any other answer will return you to the Envelope program and retain the current sound effect. If you pressed Y, you will be returned to the title screen. Here you can either quit the program completely (Q), go to the PLAY section (P), or return to the sound effect program by selecting E again.

Play Notes: A Musical Keyboard

Now let's try the PLAY NOTES section of Sound Advice. So press P at the title screen.

The PLAY NOTES screen display is similar to the one used by SET ENVELOPE. Table D displays an example from this section of Sound Advice.

First set the volume. Next set the tempo. The number you place here will determine the speed at which each note is played. The larger the number, the quicker the notes are sounded.

When you switch your 128 on, it has ten (0-9) predefined envelopes: 0 is piano, 1 is accordion, 2 is calliope, 3 is drum, etc. The PLAY NOTES program lets you redefine one of those envelopes. (In fact you can use PLAY NOTES to redefine all ten of them if you wish.) So, after the DEFINE ENVELOPE prompt, type a number. I usual-

Table A

```
NAME:ENVELOPE/NO OPTIONALS
             VOLUME:  15
            VOICE: V= 1
        FREQUENCY: F= 4444
         DURATION: D= 10

COMMAND V,    F,     D,  DR,    M,     S,    W,    P
  SOUND 1 , 4444 , 10 , 0 , 0 , 0 , 0 , 0
```

Table B

```
NAME:ENVELOPE/WITH OPTIONALS/NO PULSE WIDTH
             VOLUME:  15
            VOICE: V= 1
        FREQUENCY: F= 4444
         DURATION: D= 10
       DIRECTION: DR= 2  (OSCILLATE FREQ)
MINIMUM FREQUENCY: M= 4321
       STEP VALUE: S= 123
         WAVEFORM: W= 1  (SAWTOOTH)
      PULSE WIDTH: P= 0
EXAMPLE:

COMMAND V,    F,     D,  DR,    M,     S,    W,    P
  SOUND 1 , 4444 , 10 , 2 , 4321 , 123 , 1 , 0
```

Table C

```
NAME:ENVELOPE+OPTIONALS+PULSE WIDTH
             VOLUME:  15
            VOICE: V= 1
        FREQUENCY: F= 4444
         DURATION: D= 10
       DIRECTION: DR= 2  (OSCILLATE FREQ)
MINIMUM FREQUENCY: M= 4321
       STEP VALUE: S= 123
         WAVEFORM: W= 2  (VARIABLE PLUSE)
      PULSE WIDTH: P= 3095
EXAMPLE:

COMMAND V,    F,     D,  DR,    M,     S,    W,    P
  SOUND 1 , 4444 , 10 , 2 , 4321 , 123 , 2 , 3095
```

Table D

```
NAME:PLAY NOTES EXAMPLE
           VOLUME: VO 15
            TEMPO: TE= 2
         ENVELOPE: EN= 3
      ATTACK RATE: AR= 12
       DECAY RATE: DR= 2
    SUSTAIN LEVEL: SL= 2
     RELEASE RATE: RR= 0
         WAVEFORM: WF= 4
      PULSE WIDTH: PW= 0
    FILTER ON/OFF: FI= 0
EXAMPLE:
10 ENVELOPE  3 , 12 , 2 , 2 , 0 , 4 , 0
20 VOL  15
30 TEMPO  2
50 PLAY"V1 O4 T 3  X 0  <FOLLOWED BY SELECTED NOTES>"
```

Table E

```
NAME :SCREEN DUMP OF NOTES USING ENVELOPE DEFINED ABOVE

NOTES AND COMMANDS FROM WINDOW ARE:

FFEEDFFEEDO6FFEEDO4FFEEDO3FFEEDO6FO5F
O4FT1FFEEDT0FFEEDT3FFEED.F.F#E#E#DEED
FEAADEFEADDFEDDEO6FFFEADEAT6FDDFEDFDF
EO4FEDFO6DFFO5FFEDDFET3FFAADFEADRADDS
FFEEFFEDDDDFFFEEEDDDFFFHFFFDEADFEDDFF
U3DDDFEU7FFFDDDFU8FFEDFU9FFFD
```

ly redefine 3, the drum, first.

You define the musical properties of the envelope by inputting numbers after each prompt. Page 142 of your 128 system guide illustrates values used by the ten predefined envelopes. You may want to read over that material.

If you answer the FILTER ON prompt with 1, the lower window will open and you can set the five Filter parameters. (NOTE: FILTER is an option. I suggest you wait until you are comfortable with the other PLAY parameters before worrying about FILTER.)

The last line on the screen reads: PICK COMMAND: (S/D/P/N/C/Q)? Let me explain these six options.

S: Sounding Notes

S means "Sound effect." If you select S, the window will again open at the bottom of the screen. It will list the values of the envelope you just defined and note whether the filter is on or off.

Things get really exciting here. Your 128 now functions like a musical keyboard. If you want to hear a note, press any of the keys A through G. If you want to play a sharp, press the # key (shifted 3) and a note key (A-G). Nothing will happen until you press the note key. For flats, press 4, and for dotted notes press the period first.

By pressing O for octave, followed by a number (0-6), you can change the octave of the notes. You can select an envelope other than the one you just defined by pressing T followed by one of the envelope numbers (0-9). To change volume, press U followed by a number (0-9). To turn the filter on or off type X and then either 0 for OFF or 1 for ON.

You can even change the duration of notes by typing W (whole note), H (half note), Q (quarter note), or I (eighth note). (E is reserved for the note E) or S (sixteenth note).

In order to make Sound Advice, match the 128's sound statements exactly, R (for "rest until all voices playing end") and M (for "wait for end of measure") are included. Those two won't make much difference in the sound you hear, but since they are important features of BASIC 7.0, they are legal input.

You can even play different voices by pressing V followed by either 1, 2, or 3.

But I suggest you stick to Voice 1.

To quit the S option, press the space bar. The Q couldn't be used because it sets the duration to quarter note. All other keys, except the cursor left and right keys, are filtered out by the program. Thus, the program will not break even if you try to play a non-sound variable such as J or Z.

D: Dumping the Window

If you liked the pattern of notes and controls you played while using S, you might want a hard record, for future reference. If you do, type D and RETURN at the PICK COMMAND prompt. This will cause still another window to open on the screen. It will ask you if the printer is ready, list the name of any previously printed notes and then ask you to input another name. Then it will scan the large window containing your musical notes and transfer the information to your printer. If you are like me and use a non-Commodore printer, the reversed type in the bottom window which reports the filter status may trigger some unwanted printing results. To avoid such a problem, you can either use the cursor-left key to erase the reversed type before you start playing notes, or use the cursor-right key to make the reversed type roll up out of the window, before going to the D (dump) option. Table E is an example of how using a D option looks.

NOTE: Using the cursor-left erases the character to its left and leaves a blank. The cursor-right prints a colon. This is done simply to show you the location of the cursor. The colons will not be printed by your printer.

P: Print Option

Selection P at the PICK COMMAND prompt results in a printout of the information shown on the screen. It also creates a four-line example program which you can duplicate for use in your own programs. Table D shows a printout created by using the P option.

Line 50 of the example program ends with: (FOLLOWED BY SELECTED NOTES). If you liked the music you created with the S (Sound) option, and used the D (Dump window) option to get a hard copy of it, you can insert those notes into line 50. The result will be your first, customized, synthesized, personalized, or whatever you want to call it, melody.

N: No Sound

Selecting N at the PICK COMMAND causes the cursor to jump back up to the first number you input after the VOLUME prompt. Now you can change those numbers you want and press RETURN, or just press RETURN to keep the previous numbers. This will continue until you arrive at the PICK COMMAND line again.

C: Clear Screen

Pressing C will cause the screen to clear and the cycle will repeat, beginning with VOLUME.

Q: Quit

To quit the PLAY NOTES section of Sound Advice, press Q and answer the prompts. This will return you to the title screen.

There is no wrong way to use Sound Advice. My children simply play with it to see what sounds they can get out of it. I use it to add sound effects and music to the programs I am developing. As you experiment with the different settings, you will get a mixture of results. Some will sound awful, some may not sound at all, others will be just what you need. Those are the ones to print out and save. Later you can use them to add emphasis, excitement or just laughs to your own programs.

No matter how you use Sound Advice, I think you'll be amazed at how easy it is to coax sound out of the 128 with it.

For more information about BASIC 7.0 sound statements, read section seven (pages 129-159) of the *Commodore 128 Personal Computer System Guide* that was packed with your computer. It details how the parameter values affect sound. The information there, combined with Sound Advice, should let you dig out all the sound your livingroom can hold. So have fun.

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Sound Advice

```
2 COLOR 0,1:COLOR 4,1:COLOR 5,2
  :U$=CHR$(145)'FTPH
3 GOSUB 199:A$="16"'CGID
4 IF FL=2 THEN COLOR 4,14
  :GOTO 129'FLDH
5 IF FL=1 THEN COLOR 4,15:GOTO 8'FJDI
6 GET KEY Z$:IF Z$>CHR$(64)THEN IF
  Z$<CHR$(72)THEN Q$=Q$+Z$:RETURN'NWOR
7 GOTO 6'BBPF
8 PRINT CHR$(19):PRINT CHR$(18)" PLAY
  NOTES: ";:PRINT TAB(17)CHR$(146)
  "VOLUME (0-15)";:POKE 208,0
  :INPUT A$'JEFY
9 VO=VAL(A$):VO$="U"+A$'EMKM
10 IF VO<0 OR VO>15 THEN PRINT U$U$
   :GOTO 8'HNVE
11 VOL VO'BCCY
12 PRINT TAB(17)"TEMPO (0-255)";
   :INPUT A$'DHNF
13 TE=VAL(A$)'CGWC
14 IF TE<0 OR TE>255 THEN PRINT U$U$
   :GOTO 12'HPTI
15 PRINT'BACC
16 PRINT TAB(8)"DEFINE ENVELOPE
   #(0-9)";:INPUT A$'DGXL
17 EN=VAL(A$):EN$="T"+A$'EMXJ
18 IF EN<0 OR EN>9 THEN PRINT U$U$
   :GOTO 16'HNMM
19 PRINT TAB(12)"ATTACK RATE (0-15)";
   :INPUT A$'DHKN
20 AR=VAL(A$)'CGQA
21 IF AR<0 OR AR>15 THEN PRINT U$U$
   :GOTO 19'HOKG
22 PRINT TAB(12)"DECAY[SPACE2]
   RATE (0-15)";:INPUT A$'DHJH
23 DR=VAL(A$)'CGTD
24 IF DR<0 OR DR>15 THEN PRINT U$U$
   :GOTO 22'HOKJ
25 PRINT TAB(10)"SUSTAIN LEVEL
   (0-15)";:INPUT A$'DHQL
26 SL=VAL(A$)'CGDG
27 IF SL<0 OR SL>15 THEN PRINT U$U$
   :GOTO 25'HOGM
28 PRINT TAB(11)"RELEASE RATE (0-15)";
   :INPUT A$'DHIN
```

```
29 RR=VAL(A$)'CGIJ
30 IF RR<0 OR RR>15 THEN PRINT U$U$
   :GOTO 28'HOTG
31 PRINT"0=TRI[SPACE3]1=SAW[SPACE2]
   2=PULSE":PRINT"3=NOISE 4=RING
   "CHR$(18)"[SPACE2]WAVEFORM
   0-4)"CHR$(146);:INPUT A$'FOWS
32 WF=VAL(A$)'CGBD
33 IF WF<0 OR WF>4 THEN PRINT U$U$U$
   :GOTO 31'HPPK
34 PRINT:PRINT TAB(10)"PULSE WIDTH
   (0-4095)";:INPUT A$'EIKL
35 PW=VAL(A$)'CGLG
36 IF PW<0 OR PW>4095 THEN PRINT
   U$U$U$:GOTO 34'HSUN
37 PRINT TAB(12)"FILTER ON=1 OFF=0)
   [SPACE2]0";:FOR X=0 TO 2
   :PRINT CHR$(157);:NEXT
   :INPUT A$'JTPU
38 FI=VAL(A$)'CGMJ
39 IF FI<0 OR FI>1 THEN PRINT U$U$
   :GOTO 37'HNYP
40 IF FI=0 THEN CF=0:LP=0:BP=0:HP=0
   :RE=0:GOTO 60'JAEM
41 IF FI=1 THEN PRINT:GOSUB 240'FHDF
42 COLOR 5,7:PRINT CHR$(18)" SET
   FILTER PARAMETERS: ":COLOR 5,2'EMAN
43 PRINT"CUTOFF FREQ[SPACE3]
   (0-2047)"CHR$(18)CF;:INPUT A$'DKEM
44 CF=VAL(A$)'CGGG
45 IF CF<0 OR CF>2047 THEN PRINT U$U$
   :GOTO 43'HQKN
46 PRINT"LOW-PASS[SPACE2]
   (0=OFF 1=ON)"CHR$(18)LP;
   :INPUT A$'DKEP
47 LP=VAL(A$)'CGAJ
48 IF LP<0 OR LP>1 THEN PRINT U$U$
   :GOTO 46'HNAP
49 PRINT"BAND-PASS (0=OFF
   1=ON)"CHR$(18)BP;:INPUT A$'DKXS
50 BP=VAL(A$)'CGPD
51 IF BP<0 OR BP>1 THEN PRINT U$U$
   :GOTO 49'HNIJ
52 PRINT"HIGH-PASS (0=OFF
   1=ON)"CHR$(18)HP;:INPUT A$'DKPM
53 HP=VAL(A$)'CGVG
54 IF HP<0 OR HP>1 THEN PRINT U$U$
   :GOTO 52'HNOM
55 PRINT"RESONANCE[SPACE7]
   (0-15)"CHR$(18)RE;:INPUT A$'DKBO
56 RE=VAL(A$)'CGUJ
57 IF RE<0 OR RE>15 THEN PRINT U$U$
   :GOTO 55'HOSP
58 GOSUB 244'BDNK
60 COLOR 5,3:PRINT CHR$(19)
   :FOR X=0 TO 12:PRINT:NEXT
   :PRINT CHR$(18)" PICK COMMAND
   :[SPACE2](S/D/P/N/C/Q) ";:INPUT A$
   :COLOR 5,2'MDXW
61 IF A$="D"THEN GOSUB 104'EFAG
62 IF A$="S"THEN 68'DELH
63 IF A$="P"THEN GOSUB 251'EFPI
64 IF A$="Q"THEN GOSUB 122'EFNJ
65 IF A$="N"THEN 8'DDHJ
66 IF A$="C"THEN PRINT CHR$(147)
   :GOTO 8'GJMN
67 IF A$<>"S"THEN PRINT U$U$
   :GOTO 60'GJDP
68 GOSUB 240'BDJL
69 ENVELOPE EN,AR,DR,SL,RR,WF,PW
   :PRINT"ENVELOPE "EN;AR;DR;SL;RR;WF;
   PW'CRFB
70 VOL VO:PRINT"VOLUME "VO$"[SPACE2]
   TEMPO "TE'CIGK
71 PRINT"VOICE/1[SPACE2]
   OCTAVE/4 VOL/"VO'BCDK
72 PLAY"V1O4"+EN$+"X0":PRINT"FILTER/"
   FI"PLAY/ "EN$'EKRP
73 IF FI=1 THEN FILTER CF,LP,BP,HP,
   RE'ESIN
74 IF FI=1 THEN PLAY"X1":COLOR 5,3
   :PRINT CHR$(18)" FILTER ENABLED ";
   'HOVT
75 IF FI=0 THEN PLAY"X0"
   :PRINT CHR$(18)"FILTER DEFAULT/0 ";
   'GKET
76 COLOR 5,8:PRINT CHR$(18)" <SPACE>
   TO END ":COLOR 5,2'EMPS
77 GET Q$:IF Q$=CHR$(157)THEN PRINT
   CHR$(157)CHR$(32)CHR$(157);
   :GOTO 77'KDXW
78 IF Q$=CHR$(29)THEN PRINT
   CHR$(58)CHR$(29)CHR$(157);
   :GOTO 77'JXHV
79 IF Q$=CHR$(32)THEN Q$="Q":GOSUB 244
   :GOTO 60'HPQT
80 IF Q$>CHR$(64)THEN IF
   Q$<CHR$(74)THEN 102'IPXM
81 IF Q$=CHR$(35)THEN GOSUB 6
   :GOTO 102'GLQK
82 IF Q$=CHR$(36)THEN GOSUB 6
   :GOTO 102'GLRL
83 IF Q$=CHR$(46)THEN GOSUB 6
   :GOTO 102'GLSM
84 IF Q$<CHR$(77)THEN 77'EICM
85 IF Q$>CHR$(88)THEN 77'EICN
86 IF Q$="N"THEN 77'DEWN
87 IF Q$="P"THEN 77'DEYO
88 IF Q$>CHR$(79)THEN IF
   Q$<CHR$(84)THEN 102'IPFU
89 IF Q$<CHR$(79)THEN 102'EJQR
90 IF Q$="V"THEN BEGIN:GET KEY Z$
   :IF VAL(Z$)>3 THEN Z$="3"'LOUQ
91 IF VAL(Z$)<1 THEN Z$="1"'FHML
92 BEND:Q$=Q$+Z$'DIVL
93 IF Q$="O"THEN BEGIN:GET KEY Z$
   :IF VAL(Z$)>6 THEN Z$="6"'LOTT
94 IF VAL(Z$)<1 THEN Z$="0"'FHLO
95 BEND:Q$=Q$+Z$'DIVO
96 IF Q$="T"THEN BEGIN:GET KEY Z$
   :IF VAL(Z$)<1 THEN Z$="0"'LOPW
97 BEND:Q$=Q$+Z$'DIVQ
98 IF Q$="U"THEN BEGIN:GET KEY Z$
   :IF VAL(Z$)>9 THEN Z$="9"'LOGY
99 BEND:Q$=Q$+Z$'DIVS
100 IF Q$="X"THEN BEGIN:GET KEY Z$
```

```
    :IF VAL(Z$)<>1 THEN Z$="0"'MOQH
101 BEND:Q$=Q$+Z$'DIVA
102 PLAY Q$:PRINT Q$;:GOTO 77'DKRB
104 WINDOW 2,12,30,15,1'BNLC
105 COLOR 5,3:FOR Y=0 TO 28
    :PRINT CHR$(166);:NEXT'HQDH
106 PRINT"[SPACE3]DUMP WINDOW TO
    PRINTER[SPACE3]"'BAKI
107 FOR Y=0 TO 28:PRINT CHR$(166);
    :NEXT:SLEEP 1:COLOR 5,2'ITML
108 GOSUB 246'BDPE
109 IF B$<>"Y"THEN GOSUB 128
    :RETURN'GGTJ
110 OPEN 1,4:PRINT#1,"NAME :"N$
    :PRINT#1'DKIB
111 PRINT#1,"NOTES AND COMMANDS FROM
    WINDOW ARE:":PRINT#1'CEEI
112 FOR Y=1704 TO 1904 STEP 40
    :FOR X=1 TO 37:N=PEEK(Y+X)
    :Z$=STR$(N):GOSUB 114:NEXT:PRINT#1
    :NEXT'QLOQ
113 GOTO 118'BDJA
114 IF N=58 THEN PRINT#1,CHR$(32);
    :RETURN'GLUG
115 IF N<27 THEN PRINT#1,CHR$(N+64);
    'GLTH
116 IF N>27 THEN PRINT#1,CHR$(N);'FJWH
117 RETURN'BAQD
118 PRINT#1:CLOSE 1:GOSUB 277
    :GOSUB 128:RETURN'FMAJ
119 END'BACF
122 PRINT TAB(8)"<ARE YOU SURE
    (Y/N)?>":GET KEY A$'EFJI
123 IF A$="Y"THEN RUN'ECTD
124 IF A$<>"Y"THEN PRINT U$;'FFLF
125 FOR X=0 TO 29:PRINT CHR$(32);:NEXT
    :A$="Z":RETURN'IPHK
128 PRINT CHR$(19):FOR X=0 TO 10:PRINT
    :NEXT:FOR Y=0 TO 3:PRINT TAB(1);
    :GOSUB 125:PRINT:NEXT:RETURN'QBYU
129 PRINT CHR$(19):PRINT CHR$(18)"
    SET ENVELOPE: ";:PRINT
    TAB(17)CHR$(146)"VOLUME (0-15)";
    :POKE 208,0:INPUT A$'JEUY
130 VO=VAL(A$)'CGJA
131 IF VO<0 OR VO>15 THEN PRINT U$U$
    :GOTO 129'HPQH
132 VOL VO'BCCB
133 PRINT TAB(19)"VOICE (1-3)";
    :INPUT A$'DHAG
134 V=VAL(A$)'CFFE
135 IF V<1 OR V>3 THEN PRINT U$U$
    :GOTO 133'HMIK
136 PRINT TAB(11)"FREQUENCY
    (0-65535)";:INPUT A$'DHQL
137 F=VAL(A$)'CFOH
138 IF F<0 OR F>65535 THEN PRINT U$U$
    :GOTO 136'HQQN
139 PRINT TAB(12)"DURATION (0-32767)";
    :INPUT A$'DHQO
140 D=VAL(A$)'CFMB
141 IF D<0 OR D>32767 THEN PRINT U$U$
    :GOTO 139'HQQH
142 COLOR 5,3:PRINT CHR$(18)"[SPACE5]
    OPTIONAL PARAMETERS (Y/N)[SPACE2]
    Y"CHR$(146);:FOR X=0 TO 2
    :PRINT CHR$(157);:NEXT:INPUT J$
    :COLOR 5,2:PRINT'NJEY
143 IF J$="N"THEN FOR Y=0 TO 6
    :GOSUB 125:PRINT:NEXT:DR=0:M=0:S=0
    :W=0:P=0:GOTO 160'PGGS
144 COLOR 5,7:PRINT CHR$(18)"[SPACE5]
    SWEEP DIRECTION[SPACE10]"
    :COLOR 5,2:PRINT TAB(7)"0=UP,
    1=DOWN,2=OSCILLATE";:INPUT A$'HTLY
145 DR=VAL(A$)'CGTG
146 IF DR<0 OR DR>2 THEN PRINT U$U$U$
    :GOTO 144'HQBN
147 PRINT"[SPACE2]MINIMUM SWEEP FREQ
    (0-65535)";:INPUT A$'CECP
148 M=VAL(A$)'CFVJ
149 IF M<0 OR M>65535 THEN PRINT U$U$
    :GOTO 147'HQCQ
150 PRINT TAB(4)"SWEEP STEP VALUE
    (0-32767)";:INPUT A$'DGXJ
151 S=VAL(A$)'CFCD
152 IF S<0 OR S>32767 THEN PRINT U$U$
    :GOTO 150'HQJK
153 COLOR 5,7:PRINT CHR$(18)"[SPACE5]
    WAVEFORM[SPACE17]":COLOR 5,2
    :PRINT" 0=TRI,1=SAW,2=VAR PUL,
    3=NOISE";:INPUT A$'GREX
154 W=VAL(A$)'CFGG
155 IF W<0 OR W>3 THEN PRINT U$U$U$
    :GOTO 153'HOHM
156 IF W<>2 THEN COLOR 5,3
    :PRINT TAB(10)"//////////////////
    ///[SPACE7]":COLOR 5,2'INET
157 IF W=2 THEN PRINT TAB(10)"PULSE
    WIDTH (0-4095)";:INPUT A$'GJIR
158 IF W=2 THEN P=VAL(A$)'FHIM
159 IF W=2 THEN IF P<0 OR P>4095 THEN
    PRINT U$U$:GOTO 157'KRNT
160 SOUND V,F,D,DR,M,S,W,P'BQCF
161 PRINT CHR$(19);:FOR X=0 TO 13
    :PRINT:NEXT'HMAI
162 COLOR 5,3:PRINT CHR$(18)"[SPACE5]
    SOUND AGAIN[SPACE3](Y/N/C/Q/P)
    [SPACE2]Y"CHR$(146);:FOR X=0 TO 2
    :PRINT CHR$(157);:NEXT:INPUT B$
    :COLOR 5,2'MIWA
163 IF B$="Y"THEN 160'DFIH
164 IF B$="Q"THEN GOSUB 122'EFOI
165 IF B$="C"THEN PRINT CHR$(147)
    :GOTO 168'GLKM
166 IF B$="P"THEN GOSUB 170'EFQK
167 IF B$<>"N"THEN 161'EFBL
168 V=0:F=0:D=0:DR=0:M=0:S=0:W=0
    :P=0'IYXU
169 GOTO 129'BDLL
170 GOSUB 245'BDOD
171 IF B$<>"Y"THEN RETURN'FCCG
172 IF DR=0 THEN D$="(INCREMENT
    FREQ)"'EFXM
173 IF DR=1 THEN D$="(DECREASE
    FREQ)"'EFXM
```

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174 IF DR=2 THEN D$="(OSCILLATE
    FREQ)"'EFUO
175 IF W=0 THEN W$="(TRIANGLE)"'EEWN
176 IF W=1 THEN W$="(SAWTOOTH)"'EEIO
177 IF W=2 THEN W$="(VARIABLE
    PLUSE)"'EEHQ
178 IF W=3 THEN W$="(NOISE)"'EEMP
179 OPEN 1,4:GOSUB 198'CHCN
180 PRINT#1,"NAME:"N$:GOSUB 198'CIWH
181 PRINT#1,"[SPACE13]VOLUME: "VO
    :GOSUB 198'CITK
182 PRINT#1,"[SPACE12]VOICE: V="V
    :GOSUB 198'CHIL
183 PRINT#1,"[SPACE8]FREQUENCY: F="F
    :GOSUB 198'CHMN
184 PRINT#1,"[SPACE9]DURATION: D="D
    :PRINT:GOSUB 198'DIYO
185 IF J$="N"THEN 192'DFKL
186 PRINT#1,"[SPACE7]DIRECTION
    : DR="DR" "D$:GOSUB 198'CKER
187 PRINT#1,"MINIMUM FREQUENCY: M="M
    :GOSUB 198'CHSS
188 PRINT#1,"[SPACE7]STEP VALUE: S="S
    :GOSUB 198'CHUS
189 PRINT#1,"[SPACE9]WAVEFORM
    : W="W" "W$:GOSUB 198'CJHT
190 PRINT#1,"[SPACE6]PULSE WIDTH: P="P
    :GOSUB 198'CHNL
191 PRINT#1,"EXAMPLE:":GOSUB 198'CGVJ
192 PRINT#1:PRINT#1,"COMMAND V,
    [SPACE4]F,[SPACE4]D,[SPACE2]DR,
    [SPACE3]M,[SPACE4]S,[SPACE3]W,
    [SPACE3]P":GOSUB 198'DIDS
193 PRINT#1,"[SPACE2]SOUND"V","F","D",
    "DR","M","S","W","P:GOSUB 198'CPKP
194 PRINT#1:CLOSE 1:GOSUB 198'DHKL
195 PRINT:PRINT"FINISHED":GR$=""'DFCO
196 GOSUB 244 :REM CLOSE WINDOW'CPLP
197 RETURN'BAQL
198 PRINT GR$+"*";:GR$=GR$+"*"
    :RETURN'FMES
199 PRINT CHR$(147)'CFBP
200 VOL 15:V=1:F=43333:D=60:S=300:W=1
    :FOR X=1 TO 5:GOSUB 227'KHRJ
201 GOSUB 234:IF FL>0 THEN X=7
    :GOTO 225'GNLD
202 GOSUB 226:PRINT CHR$(19)
    :FOR Z=0 TO X:PRINT:NEXT:NEXT'JPKG
203 V=1:F=64000:D=50:DR=0:M=55500
    :S=1200:W=1:P=0:GOSUB 226'JPNO
204 FOR X=0 TO 3:PRINT:NEXT'FFHE
205 COLOR 5,11:PRINT TAB(9);
    :FOR X=0 TO 22:PRINT CHR$(175);
    :NEXT:PRINT:SLEEP 2'LADN
206 COLOR 5,8:PRINT TAB(9)CHR$(18)"
    FOR THE COMMODORE 128 "'EKVM
207 COLOR 5,16:PRINT TAB(9);
    :FOR X=0 TO 22:PRINT CHR$(183);
    :NEXT:PRINT'KWQO
208 V=1:DR=1:GOSUB 226'DKBI
209 PRINT:PRINT:COLOR 5,12
    :PRINT TAB(9)"BY GARY FIELDS (C)
    1985":PRINT'GKBQ
210 PRINT"[SPACE11]< 'P'[SPACE2]
    FOR PLAY[SPACE3]>"
    :PRINT"[SPACE11]< 'E' FOR
    ENVELOPE>"'CBPK
211 PRINT"[SPACE11]< 'Q'[SPACE2]
    TO QUIT[SPACE4]>":COLOR 5,2'CEHF
212 V=1:F=100:D=30:DR=2:M=45500:S=50
    :W=2:P=444'IJGM
213 GOSUB 234'BDMB
214 GOSUB 226:F=INT(RND(0)*55000)
    +1'GQCI
215 TE=INT(RND(1)*40)+10'FLSH
216 D=INT(RND(1)*40)+15'FKNI
217 VO=INT(RND(6)*15)+1:VOL VO'GNTL
218 DR=INT(RND(0)*3)'EIEJ
219 M=INT(RND(1)*45000)'ELFK
220 W=INT(RND(1)*4)'EHSC
221 IF W=2 THEN P=INT(RND(1)*4000)
    'HMIG
222 READ J$:IF J$="Q"THEN RESTORE
    :GOTO 222'GJIF
223 VOL 15:TEMPO TE:PLAY
    J$+"RRABCDEFGRGFEDCRR"'EKYL
224 IF FL<1 THEN 213'DGLF
225 PRINT CHR$(147):COLOR 4,12
    :COLOR 5,2:RETURN'FPWJ
226 GOSUB 234:SOUND V,F,D,DR,M,S,W,P
    :RETURN'DVRK
227 COLOR 5,X              'BDJG
228 PRINT TAB(X)"[RVS,SPACE2,SHFT U,
    SHFT C,SHFT I,SPACE10,SHFT U,
    SHFT I,SPACE14]"'CCTP
229 PRINT TAB(X)"[RVS,SPACE2,SHFT J,
    SHFT C,SHFT I,SHFT U,SHFT I,
    SHFT B2,SHFT U,SHFT I] [SHFT B,
    SPACE2,SHFT B2] [SHFT B,SPACE3].
    [SHFT U,SHFT I,SHFT U,SHFT I,
    SPACE4]"'CCJY
230 PRINT TAB(X)"[RVS,SPACE4,SHFT B4,
    SHFT -,SHFT B2,SHFT U,CMDR W,
    SPACE2,CMDR Q,CMDR W,SHFT U,
    CMDR W,CMDR H,CMDR N] [SHFT B2]
    [CMDR Q,SHFT K,SPACE4]"'CCTQ
231 PRINT TAB(X)"[RVS] [SHFT J,
    SHFT C2,SHFT K,SHFT J,SHFT K,
    SHFT J,CMDR W,SHFT B2,SHFT J,
    CMDR W,SPACE2,SHFT B2,SHFT J,
    CMDR W,SHFT M,SHFT N] [SHFT B,
    SHFT J,SHFT K,SHFT J,SHFT C3,
    SHFT I] "'CCIW
232 PRINT TAB(X)CHR$(18)"[SPACE31]
    "'DGEI
233 RETURN'BAQC
234 GET A$'BCGE
235 IF A$="P"THEN FL=1'EFPI
236 IF A$="E"THEN FL=2'EFFJ
237 IF A$="Q"THEN END'ECBJ
238 RETURN'BAQH
240 PRINT CHR$(19):FOR X=0 TO 14:PRINT
    :NEXT'HLRG
241 PRINT"[SHFT U,SHFT C37,SHFT I]"
    :FOR X=0 TO 5:PRINT"[SHFT B]
    "SPC(37)"[SHFT B]":NEXT
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Continued on pg. 123

ATTENTION PLUS/4 OWNERS!

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BY DAVID R. BROOKS

Getting Started with MIDI Music

Part 2

Part 1 of "Getting Started with MIDI Music" (*Commodore Microcomputers* March/April, 1986) discussed some of the things you need to know to assemble a music system based on the musical instrument digital interface (MIDI). In this article, I'll detail how to choose hardware and software for your Commodore 64 or 128 to create a complete MIDI music system.

How to choose hardware and software for your Commodore 64 or 128 to create a complete MIDI music system.

MIDI Hardware Interface

I've used two interfaces for the 64: one from Passport Designs and one from Sequential. Both link your computer to MIDI-compatible sound synthesizers. They both plug into the 64's cartridge slot, include one MIDI-in and one MIDI-out connector, and require separate disk-based software. Since all 64 interfaces work with the 128 in 64 mode, both of these interfaces work with the 128 also.

However, they have several significant differences. While the Passport interface has an additional 5-pin DIN connector labelled "drum," Sequential's Model 242 includes two 1/4" phone jacks, one for a footswitch and the other for an external clock input.

MIDI Software

To control communications between your computer and the MIDI equipment, you need a program partly written in machine language. A sequencer is a program that records, stores, and plays music. But remember that these programs store not the sounds themselves, but the information necessary to re-create the sounds through a synthesizer.

Software sequencers typically include functions to manipulate parameters, and may be written for MIDI or non-MIDI instruments. Note that although music programs for the 64's SID chip contain sequencers, they will not work with MIDI equipment unless they're specifically designed to be compatible with both SID and MIDI.

However, for the most part, software sequencers are a wiser investment than hardware sequencers, because software is more flexible and can be updated. I use Passport Designs' *MIDI/8 Plus* with Passport's MIDI interface or the *Keyboard Controlled Sequencer* from Dr. T's Music Software, which has versions for the Sequential, Passport Designs, Yamaha, or Korg interfaces.

MIDI Hardware

My primary sound source is Sequential's Six-Trak polyphonic synthesizer, a six-voice stand-alone keyboard instrument. It contains a hardware sequencer that will store about 800 notes and retain them permanently. Six-Trak will operate either in the "omni" mode, with all six voices assigned the same sound, or in the "mono" mode, with up to six individually voiced sound settings (or "patches"). The Six-Trak contains 100 preset sound patches that can be changed either temporarily or permanently from the keyboard, or temporarily from a MIDI program. The Six-Trak does not have a MIDI-thru connector, so connections to additional devices must be made through a separate MIDI-thru box.

Finally, I'm using an optional piece of equipment, a PAIA Electronics Model 6770 Master Synchronizer. This device provides clock and metronome signals for real-time recording of musical sequences and synchronization of MIDI equipment through an interface. The Master Synchronizer is available only in kit form and requires an external power supply. One PAIA 7700 power supply will also power a number of other compatible rack-mounted sound processing modules.

Putting It Together

First, turn on the Six-Trak and make the connections to your audio system. With the audio connections in place, you can verify that the synthesizer is working properly. But there's another less apparent reason for turning on your keyboard first: Some MIDI software automatically sends signals to your MIDI equipment when you first run the program. If your keyboard isn't on when these signals are sent, your MIDI system may not operate properly. This can be very frustrating if you don't realize what's happening!

To make the connections between the keyboard and the MIDI interface, you will need two MIDI cables which may or may not be included with the MIDI hardware interface. DIN plugs and connecting cables are used for a variety of purposes, so be sure that any cables you buy are specifically intended for MIDI systems. Since accessories should never be connected or disconnected to your computer when the power is on, plug in the Passport interface, then turn on the power. You can connect or disconnect the MIDI cables at any time without hurting anything.

MIDI keyboards have several possible operating modes, including a default mode that's in effect as soon as you turn on the keyboard. The Six-Trak is initially in the polyphonic (omni) mode, that is, all six voices will play with the same sound. In its default condition, the Six-Trak won't accept parameter changes.

The Six-Trak uses on-board controls to change the operating mode, sound patch, and individual parameters. These can also be changed by MIDI commands from software. For instance, when you run MIDI software, it may change your keyboard's operating mode without telling you, because the authors assumed you would want to operate in a particular mode. Whether or not this is a problem depends on your hardware.

Now load *MIDI/8 Plus*. This software supports up to eight MIDI channels, and lets you enter up to about 5,000 notes. (A less expensive version, the *MIDI/4 Plus*, supports four channels.) It also records all other MIDI codes transmitted from your keyboard, such as key velocity, at the expense of note storage space. The *MIDI/8 Plus* essentially computerizes the analog multitrack recording equipment, presumably for the benefit of musicians who are used to pre-MIDI systems.

MIDI/8 Plus also supports an internal clock or external MIDI clock sync. This means that the program generates its own internal clock signal using the SID chip. You can hear the metronome beat from this clock through the 64's audio output, and you can change the speed from the computer keyboard.

Software sequencers are a wiser investment than hardware sequencers because software is more flexible.

There are two kinds of external clocks that can be used with MIDI systems. One is a pulse clock, like the PAIA Master Synchronizer, which produces (typically) 24 voltage pulses for each quarter note. The other kind of clock sends its timing signals as MIDI information directly through the MIDI connections. The Passport software generates clock pulses, but will not receive them; it will receive clock signals only through the MIDI-in connector.

The "drum" connector on the Passport interface is an output for clock pulses that can be used to drive a variety of non-MIDI rhythm synthesizers. Note that even though the drum output looks just like the MIDI-in/out connectors, it is not a MIDI connector. If you already have a drum machine that will accept the output, go ahead and use it. However, I strongly feel that you shouldn't buy any new or used non-MIDI equipment if you're a novice to MIDI equipment.

I did run into difficulty with the *MIDI/8 Plus* when I tried to play the preprogrammed examples included on the software disk. The first version I received would not work at all because the program automatically sent MIDI operating mode commands that were inappropriate for the Six-Trak.

The current version rectifies this problem, although the Six-Trak must still be manually programmed to play in the mono mode before any sequences can be played or recorded. The reason for this is that the software was written for a market that at the time consisted primarily of keyboards operating only in the polyphonic mode. If you come across Passport software that doesn't seem to work correctly with your MIDI keyboard, contact Passport for information about updated versions.

I do find the restrictions of real-time recording and punch-in/punch-out editing awkward, even though I have some technical facility on keyboard instruments. The program has a step-time editor that allows you to play through a recorded musical sequence one clock pulse at a time and make changes, but I find it difficult to position myself exactly where I need to be in a sequence, especially if there are multiple voices on the same track. When you're in this mode, notes resound until you advance to the clock pulse that contains their off command. This can be confusing.

For newcomers to computer music who have little familiarity with analog multitrack recording, *MIDI/8 Plus* may be too confusing. I should point out, however, that Passport Designs was one of the first to provide MIDI interfaces and software, at a time when the relationship between MIDI and pre-MIDI music was just being formulated.

Alternative System

Now let's take a look at a different MIDI system that has a different approach. I can switch the Passport interface with Sequential's Model 242, because the Sequential interface will accept my PAIA Master Synchronizer pulse clock signal. Remember that this is an optional piece of equipment and not necessary to the basic functioning of the MIDI system.

In this system, I use Dr. T's *Keyboard Controlled Sequencer*. Like the Passport program, it also sends some "invisible" commands to the Six-Trak keyboard, so you may have trouble if you haven't turned the keyboard on before loading and running the program. Dr. T's manual gives a brief but useful introduction to using the program with not only the Six-Trak, but other MIDI keyboards.

Dr. T's software automatically enables the Six-Trak to accept sound patch and parameter changes sent as MIDI commands, a condition that is not part of this keyboard's default operating mode. If you want to use the Six-Trak's mono mode with its six individually programmed sound patches, you have to manually put it into this mode.

Dr. T.'s sequencer will operate with

its own internal clock (its metronome tick can be heard through the 64's audio output), an external pulse clock, or an external MIDI clock. It provides timing signals only as MIDI output, reflecting the fact that most new rhythm synthesizers are MIDI devices.

This sequencer will record real-time keyboard input (several thousand MIDI events), store it, and play it back just like Passport's *MIDI/8 Plus*. But beyond these basic functions, its approach to editing and managing musical information varies. The editor works by directly displaying a file of MIDI events on the monitor. This file might have been created from music you played on a music keyboard, but you can also create a file entirely from the computer keyboard.

Then, using the line-editing capabilities of the 64, you can edit individual events and their components one at a time and hear the results by playing the altered sequence from within the editor. New musical information or sound patch and parameter changes can be inserted anywhere in a sequence. Groups of MIDI events can be moved, duplicated, or deleted. There is also a step-time music composition utility for keyboard entry, and a number of built-in functions for automatic editing, such as rhythm quantizing, pitch transposition, and note length compression or expansion.

Many programs give quantizing possibilities in musical terms, like "round off all MIDI events to the nearest sixteenth note," but Dr. T's software asks you to specify the number of clock counts, as in "round off all MIDI events to the nearest six clock pulses." This approach may be a little harder for a musician to get used to, but in the end, it is much more flexible.

With this program, there are several ways to manipulate musical sequences. The most straightforward way is to start and stop individual sequences in the program's "play" mode, where up to 35 different sequences can be stored in the 64's memory at once. A more elegant way is to construct MIDI files that consist entirely of directions for sound patches and parameter changes, as well as instructions for playing other sequences. These MIDI command events are in the same format as music sequences, so they can be intermixed with music passages. Dr. T's sequencer also provides several kinds of real-time control when playing MIDI music, including pitch transposition.

Manufacturers

Casio, Electronic Musical
Instrument Division
15 Gardner Rd.
Fairfield, NJ 07006
Model CZ101 MIDI keyboard $499.00
Model CZ1000 MIDI keyboard $699.00

Dr. T's Music Software
24 Lexington St.
Watertown, MA 02172
Keyboard Controlled Sequencer $125.00

Korg/Unicord
89 Frost St.
Westbury, NY 11590
KMT-60 MIDI-thru box $69.95

PAIA Electronics, Inc.
1020 W. Wilshire Blvd.
Oklahoma City, OK 73116
Model 6770 Master Synchronizer (kit) $74.95
Model 7700 Rack Mount Power Supply (kit) $59.95

Passport Designs, Inc.
625 Miramontes St., Suite 103
Half Moon Bay, CA 94019
MIDI interface $129.95
MIDI/4 Plus sequencer $99.95
MIDI/8 Plus sequencer $149.95

Sequential, Inc.
3051 North First St.
San Jose, CA 95134
Six-Trak keyboard synthesizer $899.00
Model 242 MIDI interface $99.00
Model 910 MIDI sequencer $99.00

Expanding Your MIDI System

You may decide that one MIDI keyboard isn't enough. For example, all six voices of the Six-Trak are channeled through a single audio output, so a stereo effect is impossible. MIDI systems are easy to expand, and both the systems I've described will support multiple MIDI devices.

I've expanded my system by adding a Korg KMT-60 MIDI-thru box and a Casio CZ-101 keyboard. The KMT-60 accepts as input the output from a MIDI interface and distributes the signal among as many as six MIDI devices. The CZ-101 is a relatively inexpensive synthesizer that easily could be the only synthesizer in a MIDI system. It does have inconvenient, small keys, but is not much of a problem if another keyboard like the Six-Trak is used as the "master" unit. Another Casio keyboard, the CZ-1000, is functionally identical to the CZ-101, but has full-size keys.

The CZ-101 operates in the omni or mono mode with up to four separate channels. As a stand-alone keyboard, it can play up to eight parts simultaneously. It includes 32 preprogrammed sound patches plus a connector for an optional cartridge that will hold 16 more. The CZ-101 uses what Casio calls "phase distortion" to generate sound and filter envelopes. This produces sophisticated sound, because two sound channels can be assigned to each MIDI channel.

Although the CZ-101 is a welcome addition to my system, it is not without its challenges. In principle, the preprogrammed sound patches can be reprogrammed either from the keyboard's own controls or under computer control. However, I find the programming procedures complicated and difficult to relate to a desired musical goal. Special sound patch generating programs are highly desirable to get the most from this keyboard.

Programming of the CZ-101 is additionally complicated by the fact that sound patch information is transmitted not as standard MIDI information (the way the Six-Trak parameter changes work), but as "system exclusive" information.

Several companies, including Dr. T's Music Software, have or are developing CZ-101 sound patch programs to support this new keyboard. Because the individual parameters of sound patches can't be changed quickly with MIDI commands like they can on the Six-Trak, user-generated sound patches must be established ahead of time and stored in place of some of the preprogrammed ones or on a plug-in cartridge.

Continued on pg. 123

BY JIM GRACELY, TECHNICAL EDITOR

Tech Notes

Technical editor Jim Gracely keeps you abreast of the latest developments in the industry.

The **Okidata 120** is a Commodore 1525-compatible printer from Okidata. With a printing speed of 120 characters per second and a price of under $300, it jumps to near the top of the list in price and performance. The footprint is small and nearly square (14"W x 11"D x 3"H), and both pinfeed and friction feed are included, with the pins located at the ends of the platen. The Okidata 120 is loaded with features: underlining, subscripts, superscripts, three character sizes, double width, emphasized and enhanced print, variable line spacing, and dot-addressable graphics.

The compatibility with the 1525 (or MPS-801) is both a blessing and a curse. On the good side, the printer is immediately compatible with almost every software package on the market that supports the 1525 (including *The Print Shop*). However, the Okidata 120's enhanced features may not be utilized from these packages, because many software packages (*EasyScript* and *Jane* included) know what a 1525 can and cannot do. So if you try to underline, the package simply sends null characters to the printer. All dressed up with no place to go. This isn't true of all packages, though. *Paperback Writer,* for example, supports the Okidata 120 completely. Many of these problems could have been resolved if the 120 had a switch for selecting either Commodore or Standard ASCII (it's Commodore ASCII default).

The manual for the 120 is very nice (as most of Okidata's are), and the printer operates quietly, quickly, and with quality. My only complaints are in the combination friction/pin feed. Because the pins are at the ends of the platens, they cannot be moved inward to feed labels. The procedure for inserting tractor-feed paper into the pinfeed is also a little tough and took me a while (and many eaten pages) to master. The trick is to let the pins do the work: insert the paper very loosely and let it slip as the pins catch. In all, however, a very nice printer at a good price.

Speaking of printers, I've been using a little device called the **Serial Box** from **R. J. Brachman Associates** out of Havertown, Pennsylvania. This is a 64K serial port buffer. Most Commodore owners aren't familiar with these devices because this is the first Commodore-serial-in to Commodore-serial-out buffer I've seen. Printer buffers are used more extensively on those "other" computers with Centronics parallel in and out.

Believe it or not, Commodore's serial bus transfer rate of 400 characters per second is far too fast for almost all printers. When you print something to the printer, the computer has to spoon-feed the printer a little bit of data at a time. The result is that the computer is actually sitting idle much of the time the printer is working. The Serial Box avoids this idleness. It can gobble up the information as fast as the computer can send it, and then turn control back to the computer. Now, the printer buffer sits and waits for the printer. In the mean time, you can go on to other projects on the computer.

There are some printer interfaces which include a buffer of some sort, but none of them provide 64K, serial in and out, or some of the other features. The Serial Box has LEDs on the front for RUN(ing), PAUSE and FULL (green, yellow and red) and buttons for pausing, resetting and clearing the buffer. The buffer gets +5VDC off the cassette port so SX-64 owners will have to do a little rewiring.

The Serial Box acts as device 6 and has a number of features than can be accessed through software. They include a range of commands for extra line feeds, pausing and clearing the buffer and changing the device and channel (printer device) defaults.

The box works wonderfully. I keep it connected all the time and I'm continuously amazed at the speed of some printouts. The buffer even responds nicely to printer alarms (out of paper, ribbon). There are some programs that think more than they print (such as *The Print Shop*). On these programs, the Serial Box won't make any difference. At $74.95, the final decision on the value of a serial printer buffer is up to you.

Master Software of Randallstown, Maryland, has come to the rescue with a product called **Modem Master.** A very simply concept actually, yet it has saved money, time, desk space and most importantly, frustration. It is based on the theory that no matter where you choose to put your computer, it will always be six inches further away from a telephone jack than the longest telephone cable you own.

Modem Master is an extension cable for your Commodore computer user port. That's it. A four-foot ribbon cable that plugs into the user port and lets you plug in a modem up to four feet away. The connector for the user port end extends about two inches from the back of the computer (about the same as a serial cable) and saves you almost four inches of space over a Commodore modem. The new user port end has a small plastic cap to keep it protected when not in use. You SX-64 users out there take special note: The 1650 modem can be used with the SX-64 and Modem Master.

A very practical product that I'm now lost without, Modem Master retails for $24.95. Modem Master Plus has also been released, which adds a fully buffered reset switch. It retails for $29.95. ■

USER GROUPS

Commodore user groups nationwide and around the world provide invaluable assistance to Commodore computerists. If you are looking for people who share your computing interests, or if you need help getting started with your computer, contact the group near you.

This list is compiled from groups who responded to a survey conducted by Pete Baczor, Commodore's user group coordinator. If you would like your group to appear here, or if you need information about Commodore's user group support, contact Pete at Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380.

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HOW TO ENTER PROGRAMS

The programs which appear in this magazine have been run, tested and checked for bugs and errors. After a program is tested, it is printed on a letter quality printer with some formatting changes. This listing is then photographed directly and printed in the magazine. Using this method ensures the most error-free program listings possible.

Whenever you see a word inside brackets, such as [DOWN], the word represents a keystroke or series of keystrokes on the keyboard. The word [DOWN] would be entered by pressing the cursor-down key. If multiple keystrokes are required, the number will directly follow the word. For example, [DOWN4] would mean to press the cursor-down key four times. If there are multiple words within one set of brackets, enter the keystrokes directly after one another. For example, [DOWN,RIGHT2] would mean to press the cursor-down key once and then the cursor-right key twice. Note: Do not enter the commas.

In addition to these graphic symbols, the keyboard graphics are all represented by a word and a letter. The word is either SHFT or CMD and represents the SHIFT key or the Commodore key. The letter is one of the letters on the keyboard. The combination [SHIFT E] would be entered by holding down the SHIFT key and pressing the E. A number following the letter tells you how many times to type the letter. For example, [SHFT A4,CMD B3] would mean to hold the SHIFT key and press the A four times, then hold down the Commodore key and press the B three times.

The following chart tells you the keys to press for any word or words inside of brackets. Refer to this chart whenever you aren't sure what keys to press. The little graphic next to the keystrokes shows you what you will see on the screen.

Syntax Error

This is by far the most common error encountered while entering a program. Usually (sorry folks) this means that you have typed something incorrectly on the line the syntax error refers to. If you get the message "?Syntax Error Break In Line 270," type LIST 270 and press RETURN. This will list line 270 to the screen. Look for any non-obvious mistakes like a zero in place of an O or vice-versa. Check for semicolons and colons reversed and extra or missing parentheses. All of these things will cause a syntax error.

There is only one time a syntax error will tell you the wrong line to look at. If the line the syntax error refers to has a function call (e.g., FN A(3)), the syntax error may be in the line that defines the function, rather than the line named in the error message. Look for a line near the beginning of the program (usually) that has DEF FN A(X) in it with an equation following it. Look for a typo in the equation part of this definition.

Illegal Quantity Error

This is another common error message. This can also be caused by a typing error, but it is a little harder to find. Once again, list the line number that the error message refers to. There is probably a poke statement on this line. If there is, then the error is referring to what is trying to be poked. A number must be in the range of zero to 255 to be poke-able. For example, the statement POKE 1024,260 would produce an illegal quantity error because 260 is greater than 255.

Most often, the value being poked is a variable (A,X...). This error is telling you that this variable is out of range. If the variable is being read from data statements, then the problem is somewhere in the data statements. Check the data statements for missing commas or other typos.

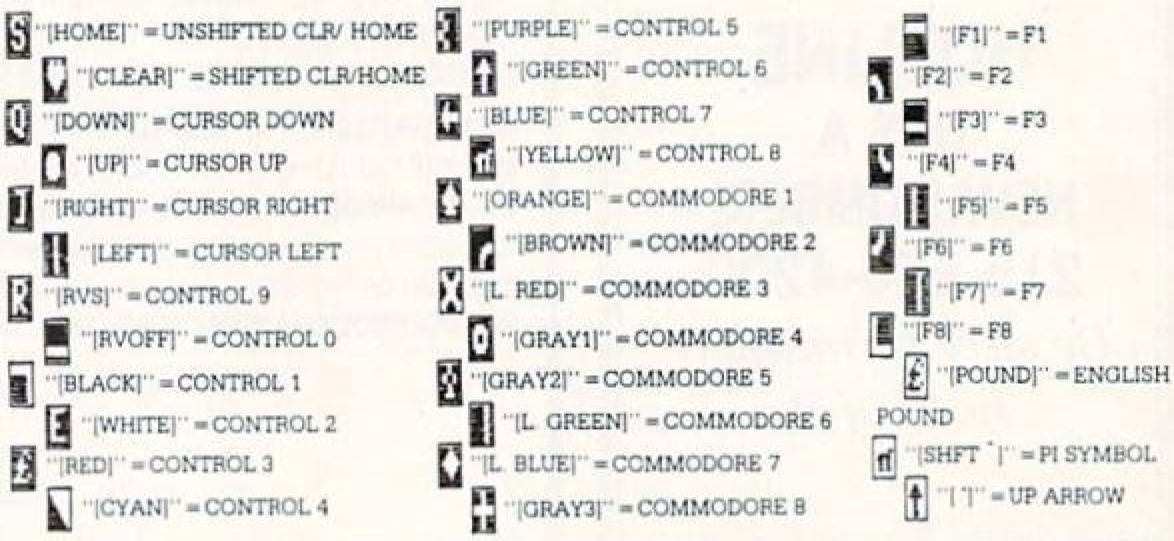
If the variable is not coming from data statements, then the problem will be a little harder to find. Check each line that contains the variable for typing mistakes.

Out Of Data Error

This error message is always related to the data statements in a program. If this error occurs, it means that the program has run out of data items before it was supposed to. It is usually caused by a problem or typo in the data statements. Check first to see if you have left out a whole line of data. Next, check for missing commas between numbers. Reading data from a page of a magazine can be a strain on the brain, so use a ruler or a piece of paper or anything else to help you keep track of where you are as you enter the data.

Other Problems

It is important to remember that the 64 and the PET/CBM computers will only accept a line up to 80 characters long. The VIC 20 will accept a line up to 88 characters long and the 128 a line up to 160 characters long. Sometimes you will find a line in a program that runs over this number of characters. This is not a mistake in the listing. Sometimes programmers get so carried away crunching programs that they use abbreviated commands to get more than the standard number of characters on one line.



"[HOME]" = UNSHIFTED CLR/ HOME
"[CLEAR]" = SHIFTED CLR/HOME
"[DOWN]" = CURSOR DOWN
"[UP]" = CURSOR UP
"[RIGHT]" = CURSOR RIGHT
"[LEFT]" = CURSOR LEFT
"[RVS]" = CONTROL 9
"[RVOFF]" = CONTROL 0
"[BLACK]" = CONTROL 1
"[WHITE]" = CONTROL 2
"[RED]" = CONTROL 3
"[CYAN]" = CONTROL 4
"[PURPLE]" = CONTROL 5
"[GREEN]" = CONTROL 6
"[BLUE]" = CONTROL 7
"[YELLOW]" = CONTROL 8
"[ORANGE]" = COMMODORE 1
"[BROWN]" = COMMODORE 2
"[L. RED]" = COMMODORE 3
"[GRAY1]" = COMMODORE 4
"[GRAY2]" = COMMODORE 5
"[L. GREEN]" = COMMODORE 6
"[L. BLUE]" = COMMODORE 7
"[GRAY3]" = COMMODORE 8
"[F1]" = F1
"[F2]" = F2
"[F3]" = F3
"[F4]" = F4
"[F5]" = F5
"[F6]" = F6
"[F7]" = F7
"[F8]" = F8
"[POUND]" = ENGLISH POUND
"[SHFT ^]" = PI SYMBOL
"[^]" = UP ARROW

GRAPHIC SYMBOLS WILL BE REPRESENTED AS EITHER THE LETTERS SHFT (SHIFT) AND A KEY ("[SHFT Q,SHFT J,SHFT D,SHFT S]") OR THE LETTERS CMDR (COMMODORE) AND A KEY ("[CMDR Q,CMDR G,COMDR Y,CMDR H]"). IF A SYMBOL IS REPEATED, THE NUMBER OF REPITITIONS WILL BE DIRECTLY AFTER THE KEY AND BEFORE THE COMMA ("[SPACE3,SHFT S4,CMDR M2]").

HOW TO ENTER PROGRAMS

You can enter these lines by abbreviating the commands when you enter the line. The abbreviations for BASIC commands are in your user guide.

If you type a line that is longer than the acceptable number of characters, the computer will act as if everything is ok, until you press RETURN. Then, a syntax error will be displayed (without a line number). Many people write that the computer gives them a syntax error when they type the line, or that the computer refuses to accept a line. Both of these problems are results of typing a line that has too many characters.

The Program Won't Run!!

This is the hardest of problems to resolve; no error message is displayed, but the program just doesn't run. This can be caused by many small mistakes typing a program in. First check that the program was written for the computer you are using. Check to see if you have left out any lines of the program. Check each line of the program for typos or missing parts. Finally, press the RUN/STOP key while the program is "running." Write down the line the program broke at and try to follow the program backwards from this point, looking for problems.

If All Else Fails

You've come to the end of your rope. You can't get the program to run and you can't find any errors in your typing. What do you do? As always, we suggest that you try a local user group for help. In a group of even just a dozen members, someone is bound to have typed in the same program. The user group may also have the program on a library disk and be willing to make a copy for you. For $9.95 per issue, you can also get all the BASIC programs in each issue, as well, from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007.

If you do get a working copy, be sure to compare it to your own version so that you can learn from your errors and increase your understanding of programming.

If you live in the country, don't have a local user group, or you simply can't get any help, write to us. If you do write to us, include the following information about the program you are having problems with:

The name of the program
The issue of the magazine it was in
The computer you are using
Any error messages and the line numbers
Anything displayed on the screen
A printout of your listing (if possible)

All of this information is helpful in answering your questions about why a program doesn't work. A letter that simply states "I get an error in line 250 whenever I run the program" doesn't give us much to go on. Send your questions to:

Commodore Magazines
1200 Wilson Drive
West Chester, PA 19380
ATTN: Program Problem

HOW TO USE THE MAGAZINE ENTRY PROGRAMS

The Magazine Entry Programs on the next pages are two BASIC machine language programs that will assist you in entering the programs in this magazine correctly. There are versions for both the Commodore 64 and the Commodore 128. Once the program is in place, it works its magic without you having to do anything else. The program will not let you enter a line if there is a typing mistake on it, and better yet, it identifies the kind of error for you.

Getting Started

Type in the Magazine Entry Program carefully and save it as you go along (just in case). Once the whole program is typed in, save it again on tape or disk. Now RUN the program. The word POKING will appear on the top of the screen with a number. The number will increment from 49152 up to 49900 (4864-5545 on the 128) and just lets you know that the program is running. If everything is ok, the program will finish running and say DONE. Then type NEW. If there is a problem with the data statements, the program will tell you where to find the problem. Otherwise the program will say "mistake in data statements." Check to see if commas are missing, or if you have used periods instead of commas. Also check the individual data items.

Once the program has run, it is in memory ready to go. To activate the program type SYS49152 (SYS4864 on the 128), and press RETURN. You are now ready to enter the programs from the magazine. To disable the Entry Program, just type KILL (RETURN) on the 64 or SYS4867 on the 128.

The checksums for each line are the same for both the 64 and 128, so you can enter your 64 programs on the 128 if you'd like.

Typing the Programs

All the BASIC program listings in this magazine that are for the 64 or 128 have an apostrophe followed by four letters at the end of the line (e.g., 'ACDF). If you plan to use the Magazine Entry Program to enter your programs, the apostrophe and letters **should** be entered along with the rest of the line. This is a checksum that the Magazine Entry Program uses.

Enter the line and the letters at the end and then press RETURN, just as you normally would.

If the line is entered correctly, a bell is sounded and the line is entered into the computer's memory (without the characters at the end).

If a mistake was made while entering the line, a noise is sounded and an error message is displayed. Read the error message, then press any key to erase the message and correct the line.

IMPORTANT

If the Magazine Entry Program sees a mistake on a line, it **does not** enter that line into memory. This makes it impossible to enter a line incorrectly.

Error Messages and What They Mean

There are five error messages that the Magazine Entry Program uses. Here they are, along with what they mean and how to fix them.

Continued next page

HOW TO USE THE MAGAZINE ENTRY PROGRAMS

NO CHECKSUM: This means that you forgot to enter the apostrophe and the four letters at the end of the line. Move the cursor to the end of the line you just typed and enter the checksum.

QUOTE: This means that you forgot (or added) a quote mark somewhere in the line. Check the line in the magazine and correct the quote.

KEYWORD: This means that you have either forgotten a command or spelled one of the BASIC keywords (GOTO, PRINT. .) incorrectly. Check the line in the magazine again and check your spelling.

# OF CHARACTERS: This means that you have either entered extra characters or missed some characters. Check the line in the magazine again. This error message will also occur if you misspell a BASIC command, but create another keyword in doing so. For example, if you misspell PRINT as PRONT, the 64 sees the letter P and R, the BASIC keyword ON and then the letter T. Because it sees the keyword ON, it thinks you've got too many characters, instead of a simple misspelling. Check spelling of BASIC commands if you can't find anything else wrong.

UNIDENTIFIED: This means that you have either made a simple spelling error, you typed the wrong line number, or you typed the checksum incorrectly. Spelling errors could be the wrong number of spaces inside quotes, a variable spelled wrong, or a word misspelled. Check the line in the magazine again and correct the mistake.

MAGAZINE ENTRY PROGRAM—64

The Magazine Entry Programs are available on disk, along with the other programs in this magazine, for $9.95. To order, contact Loadstar at 1-800-831-2694.

```
10 PRINT"[CLEAR]POKING -";
20 P=49152 :REM $C000  (END AT
   49900/$C2EC)
30 READ A$:IF A$="END"THEN 110
40 L=ASC(MID$(A$,2,1))
50 H=ASC(MID$(A$,1,1))
60 L=L-48:IF L>9 THEN L=L-7
70 H=H-48:IF H>9 THEN H=H-7
80 PRINT"[HOME,RIGHT12]"P;
90 IF H>15 OR L>15 THEN PRINT
   :PRINT"DATA ERROR IN LINE";
   1000+INT((P-49152)/8):STOP
100 B=H*16+L:POKE P,B:T=T+B:P=P+1
    :GOTO 30
110 IF T<>86200 THEN PRINT
    :PRINT"MISTAKE IN DATA --> CHECK
    DATA STATEMENTS":END
120 PRINT"DONE":END
1000 DATA 4C,1F,C0,00,00,00,00,00
1001 DATA 00,00,00,00,00,0D,00,21
1002 DATA C1,27,C1,2F,C1,3F,C1,4C
1003 DATA C1,EA,EA,EA,4C,54,C0,A2
1004 DATA 05,BD,19,C0,95,73,CA,10
1005 DATA F8,60,60,A0,03,B9,00,02
1006 DATA D9,04,C1,D0,F5,88,10,F5
1007 DATA A0,05,B9,A2,E3,99,73,00
1008 DATA 88,10,F7,A9,00,8D,18,D4
1009 DATA 4C,EF,C0,E6,7A,D0,02,E6
1010 DATA 7B,4C,79,00,A5,9D,F0,F3
1011 DATA A5,7A,C9,FF,D0,ED,A5,7B
1012 DATA C9,01,D0,E7,20,2B,C0,AD
1013 DATA 00,02,20,74,C0,90,DC,A0
1014 DATA 00,4C,A9,C1,C9,30,30,06
1015 DATA C9,3A,10,02,38,60,18,60
1016 DATA C8,B1,7A,C9,20,D0,03,C8
1017 DATA D0,F7,B1,7A,60,18,C8,B1
1018 DATA 7A,F0,37,C9,22,F0,F5,6D
1019 DATA 03,C0,8D,03,C0,AD,04,C0
1020 DATA 69,00,8D,04,C0,4C,8E,C0
1021 DATA 18,6D,05,C0,8D,05,C0,90
1022 DATA 03,EE,06,C0,EE,09,C0,4C
1023 DATA CE,C1,18,6D,08,C0,8D,08
1024 DATA C0,90,03,EE,07,C0,EE,0A
1025 DATA C0,60,0A,A8,B9,0F,C0,85
1026 DATA FB,B9,10,C0,85,FC,A0,00
1027 DATA A9,12,20,D2,FF,B1,FB,F0
1028 DATA 06,20,D2,FF,C8,D0,F6,20
1029 DATA BC,C2,20,E4,FF,F0,FB,A0
1030 DATA 18,B9,08,C1,20,D2,FF,88
1031 DATA 10,F7,68,68,A9,00,8D,00
1032 DATA 02,4C,74,A4,4B,49,4C,4C
1033 DATA 91,91,0D,20,20,20,20,20
1034 DATA 20,20,20,20,20,20,20,20
1035 DATA 20,20,20,20,20,20,20,91
1036 DATA 0D,51,55,4F,54,45,00,4B
1037 DATA 45,59,57,4F,52,44,00,23
1038 DATA 20,4F,46,20,43,48,41,52
1039 DATA 41,43,54,45,52,53,00,55
1040 DATA 4E,49,44,45,4E,54,49,46
1041 DATA 49,45,44,00,4E,4F,20,43
1042 DATA 48,45,43,4B,53,55,4D,00
1043 DATA C8,B1,7A,D0,FB,84,FD,C0
1044 DATA 09,10,03,4C,84,C1,88,88
1045 DATA 88,88,88,B1,7A,C9,27,D0
1046 DATA 13,A9,00,91,7A,C8,A2,00
1047 DATA B1,7A,9D,3C,03,C8,E8,E0
1048 DATA 04,D0,F5,60,A9,04,4C,CA
1049 DATA C0,A0,00,B9,00,02,99,40
1050 DATA 03,F0,F0,C8,D0,F5,A0,00
1051 DATA B9,40,03,F0,E6,99,00,02
1052 DATA C8,D0,F5,20,96,C1,4C,12
1053 DATA C2,A0,09,A9,00,99,03,C0
1054 DATA 8D,3C,03,88,10,F7,A9,80
1055 DATA 85,02,A0,00,20,58,C1,20
1056 DATA 89,C1,20,ED,C1,E6,7A,E6
1057 DATA 7B,20,7C,A5,A0,00,20,80
1058 DATA C0,F0,D0,24,02,F0,06,4C
1059 DATA A8,C0,4C,CE,C1,C9,22,D0
1060 DATA 06,20,8D,C0,4C,CE,C1,20
1061 DATA BA,C0,4C,CE,C1,A0,00,B9
1062 DATA 00,02,20,74,C0,C8,90,0A
1063 DATA 18,6D,07,C0,8D,07,C0,4C
1064 DATA EF,C1,88,A2,00,B9,00,02
1065 DATA 9D,00,02,F0,04,E8,C8,D0
1066 DATA F4,60,18,AD,09,C0,69,41
1067 DATA 8D,09,C0,38,AD,0A,C0,E9
1068 DATA 19,90,06,8D,0A,C0,4C,1C
1069 DATA C2,AD,0A,C0,69,41,8D,0A
```

```
1070 DATA C0,AD,03,C0,6D,05,C0,48
1071 DATA AD,04,C0,6D,06,C0,8D,0C
1072 DATA C0,68,6D,08,C0,8D,0B,C0
1073 DATA AD,0C,C0,6D,07,C0,8D,0C
1074 DATA C0,38,E9,19,90,06,8D,0C
1075 DATA C0,4C,52,C2,AD,0C,C0,69
1076 DATA 41,8D,0C,C0,AD,0B,C0,E9
1077 DATA 19,90,06,8D,0B,C0,4C,67
1078 DATA C2,AD,0B,C0,69,41,8D,0B
1079 DATA C0,A0,01,AD,09,C0,CD,3C
1080 DATA 03,D0,20,C8,AD,0A,C0,CD
1081 DATA 3D,03,D0,17,C8,AD,0B,C0
1082 DATA CD,3E,03,D0,0E,AD,0C,C0
1083 DATA CD,3F,03,D0,06,20,CC,C2
1084 DATA 4C,4B,C0,98,48,68,4C,CA
1085 DATA C0,A9,20,8D,00,D4,8D,01
1086 DATA D4,A9,09,8D,05,D4,A9,0F
1087 DATA 8D,18,D4,60,20,A9,C2,A9
1088 DATA 81,20,DF,C2,A9,80,20,DF
1089 DATA C2,4C,D9,C2,20,A9,C2,A9
1090 DATA 11,20,DF,C2,A9,10,20,DF
1091 DATA C2,A9,00,8D,04,D4,60,8D
1092 DATA 04,D4,A2,70,A0,00,88,D0
1093 DATA FD,CA,D0,FA,60,END
```

END

MAGAZINE ENTRY PROGRAM–128

```
5 TRAP 200
10 PRINT"[CLEAR]POKING -";
20 P=4864 :REM $1300  (END AT
   5545/$15A9)
30 READ A$:IF A$="END"THEN 110
80 PRINT"[HOME,RIGHT12]"P;
100 B=DEC(A$):POKE P,B:T=T+B:P=P+1
    :GOTO 30
110 IF T<>59314 THEN PRINT
    :PRINT"MISTAKE IN DATA --> CHECK
    DATA STATEMENTS":END
120 PRINT"DONE":END
200 PRINT:PRINT"DATA ERROR IN LINE";
    1000+INT((P-4864)/8):END
1000 DATA 4C,1E,13,4C,3A,13,00,00
1001 DATA 8E,00,F7,00,42,41,51,57
1002 DATA 0D,00,0D,43,08,14,0E,14
1003 DATA 16,14,26,14,33,14,A9,00
1004 DATA 8D,00,FF,AD,04,03,8D,12
1005 DATA 13,AD,05,03,8D,13,13,A2
1006 DATA 4A,A0,13,8E,04,03,8C,05
1007 DATA 03,60,AD,12,13,8D,04,03
1008 DATA AD,13,13,8D,05,03,60,6C
1009 DATA 12,13,A5,7F,D0,F9,AD,00
1010 DATA 02,20,5B,13,90,F1,A0,00
1011 DATA 4C,6F,14,C9,30,30,06,C9
1012 DATA 3A,10,02,38,60,18,60,C8
1013 DATA B1,3D,C9,20,D0,03,C8,D0
1014 DATA F7,B1,3D,60,18,C8,B1,3D
1015 DATA F0,35,C9,22,F0,F5,6D,06
1016 DATA 13,8D,06,13,AD,07,13,69
1017 DATA 00,8D,07,13,4C,75,13,18
1018 DATA 6D,08,13,8D,08,13,90,03
1019 DATA EE,09,13,EE,0C,13,60,18
1020 DATA 6D,0B,13,8D,0B,13,90,03
1021 DATA EE,0A,13,EE,0D,13,60,0A
1022 DATA A8,B9,14,13,85,FB,B9,15
1023 DATA 13,85,FC,A0,00,8C,00,FF
1024 DATA A9,12,20,D2,FF,B1,FB,F0
1025 DATA 06,20,D2,FF,C8,D0,F6,20
1026 DATA 79,15,20,A3,15,20,E4,FF
1027 DATA F0,FB,A0,1B,B9,EF,13,20
1028 DATA D2,FF,88,10,F7,68,68,A9
1029 DATA 00,8D,00,02,4C,B7,4D,91
1030 DATA 91,0D,20,20,20,20,20,20
1031 DATA 20,20,20,20,20,20,20,20
1032 DATA 20,20,20,20,20,20,91,0D
1033 DATA 51,55,4F,54,45,00,4B,45
1034 DATA 59,57,4F,52,44,00,23,20
1035 DATA 4F,46,20,43,48,41,52,41
1036 DATA 43,54,45,52,53,00,55,4E
1037 DATA 49,44,45,4E,54,49,46,49
1038 DATA 45,44,00,4E,4F,20,43,48
1039 DATA 45,43,4B,53,55,4D,00,C8
1040 DATA B1,3D,D0,FB,C0,09,10,03
1041 DATA 4C,69,14,88,88,88,88,88
1042 DATA B1,3D,C9,27,D0,13,A9,00
1043 DATA 91,3D,C8,A2,00,B1,3D,9D
1044 DATA 00,0B,C8,E8,E0,04,D0,F5
1045 DATA 60,4C,5C,15,4C,C5,14,A0
1046 DATA 09,A9,00,99,06,13,8D,00
1047 DATA 0B,88,10,F7,A9,80,85,FD
1048 DATA A0,00,20,3F,14,20,AE,14
1049 DATA 20,0D,43,84,FA,A0,FF,20
1050 DATA 67,13,F0,D8,24,FD,F0,06
1051 DATA 20,8F,13,4C,8F,14,C9,22
1052 DATA D0,06,20,74,13,4C,8F,14
1053 DATA 20,9F,13,4C,8F,14,A0,00
1054 DATA B9,00,02,20,5B,13,C8,90
1055 DATA 0A,18,6D,0A,13,8D,0A,13
1056 DATA 4C,B0,14,88,60,18,AD,0C
1057 DATA 13,69,41,8D,0C,13,38,AD
1058 DATA 0D,13,E9,19,90,06,8D,0D
1059 DATA 13,4C,CF,14,AD,0D,13,69
1060 DATA 41,8D,0D,13,AD,06,13,6D
1061 DATA 08,13,48,AD,07,13,6D,09
1062 DATA 13,8D,0F,13,68,6D,0B,13
1063 DATA 8D,0E,13,AD,0F,13,6D,0A
1064 DATA 13,8D,0F,13,38,E9,19,90
1065 DATA 06,8D,0F,13,4C,05,15,AD
1066 DATA 0F,13,69,41,8D,0F,13,AD
1067 DATA 0E,13,E9,19,90,06,8D,0E
1068 DATA 13,4C,1A,15,AD,0E,13,69
1069 DATA 41,8D,0E,13,A0,01,AD,0C
1070 DATA 13,CD,00,0B,D0,20,C8,AD
1071 DATA 0D,13,CD,01,0B,D0,17,C8
1072 DATA AD,0E,13,CD,02,0B,D0,0E
1073 DATA AD,0F,13,CD,03,0B,D0,06
1074 DATA 20,89,15,A4,FA,60,98,48
1075 DATA 68,4C,AF,13,A9,04,4C,AF
1076 DATA 13,A9,00,8D,00,FF,A9,20
1077 DATA 8D,00,D4,8D,01,D4,A9,09
1078 DATA 8D,05,D4,A9,0F,8D,18,D4
1079 DATA 60,20,61,15,A9,81,20,9C
1080 DATA 15,A9,80,20,9C,15,4C,96
1081 DATA 15,20,61,15,A9,11,20,9C
1082 DATA 15,A9,10,20,9C,15,A9,00
1083 DATA 8D,04,D4,60,8D,04,D4,A2
1084 DATA 70,A0,00,88,D0,FD,CA,D0
1085 DATA FA,60,END
```

END

FIGHT NIGHT

Continued from pg. 49

flatfooted and slugging away. Beginners should remember to always step into a punch for maximum scoring. Footwork is very important to win the game.

Joystick action and scoring are a matter of timing, controlled through a series of "pulses." A typical punch consists of four pulses: punch selection, wind up, execution and follow through. This is shortened by faking a punch and following with the real thing, eliminating the wind up. The number of points awarded for each blow depends on your opponent's resistance and the timing of your swing. Each time you are hit, you are penalized up to three pulses, during which time you cannot throw a punch. Confusing at first, it becomes second nature with practice. Other options allow sparring of created boxers to observe how they perform. If you notice a problem with your fighter, return to the construction screen for modifications.

Tournament play is perhaps the most exciting aspect of *Fight Night.* Here you and another player assume the role of fight promoters, matching your best fighters in a small round-robin competition. These head-to-head fights bring out the true passion and intensity of boxing.

There are three rounds in a match, each lasting three minutes, whether you choose the Boxing, Sparring or Tournament modes of play. The boxing ring itself is very well drawn. Above the ring are several panels showing the clock, round number, each boxer's name, picture, score and K.O. bar. Each time you land a blow, your score goes up and the K.O. bar increases. Knocking out your opponent or winning by decision brings cheers from the crowd.

There are only a few items I feel are missing from this otherwise excellent sports game. An adjustable computer skill level for the Boxing event would be nice, because, as with most solitaire sports games, it loses some appeal after it is mastered.

On the whole, this is an impressive boxing simulation that doesn't take itself too seriously. The object is to have fun, after all. It is this rare combination of exciting action and dark humor that makes *Fight Night* something special.

NORWAY 1985

Continued from pg. 36

computer against computer. The computer-against-computer option gives you a chance to study the game without having to enter commands. Novice players will welcome this option.

The keyboard is used to issue battle orders. To move a unit, you must press one of the number keys. For instance, pressing "1" moves the unit north, "2" northeast, "3" southeast, "4" south, and so on. This odd command selection results in frequently misdirected battle orders. But since Strategic Simulations uses similar command keys in almost all their games, you might as well learn them now. However, the game does offer an option which allows a quick and easy way to jump to any of the battlefield's 12 sectors or quickly scroll the map.

The game comes with a player's manual for *Germany 1985* and a supplementary rule book for *Norway 1985.* So before you can learn *Norway 1985's* game rules, you must first learn the rules of a previous game, *Germany 1985.* Then, using the eight-page supplement, make changes where they are appropriate. This is a nuisance. Those familiar with *Germany 1985* won't mind this substitute for a manual, but others may throw up their hands in frustration.

The game itself is well designed. Both the graphic displays used for the map and military units and the game's sound effects are what you would expect from a good wargame. And *Norway 1985's* response time is much faster than most Strategic Simulations games. Action and counter-action can be almost instantaneous. Wargamers accustomed to the sometimes sluggish combat action of other simulations will also appreciate the option to either speed up or even slow down play.

An average game takes two to four hours to complete. But you don't have to finish the game in a single sitting, since a "save uncompleted game" option is included.

This game is for the seasoned wargamer looking for new territory to conquer. If you want a real challenge and don't mind reading two manuals to play one game, *Norway 1985* offers hours of mind-expanding strategy simulation.

DAM BUSTERS

Continued from pg. 34

There is a lot going on here—enough that experienced gamers will doubt it can all happen in a 64 without shortcuts. They are correct, yet this is a case where programming shortcuts help the game rather than hinder it.

Your first view of the flight deck may seem disappointing. There are only four instruments on the panel, and you know any aircraft must have more. Yet these are the only four necessary to the mission. The view out the windscreen shows no detail, only a few points of light. Yet, as you move the joystick right or left, the airplane banks smoothly. If the programmers had opted for more ground detail, the process of redrawing with every movement of the aircraft would have slowed the game considerably. You'll find other stations in the Lancaster bomber drawn just as sparsely, and for the same reasons—rather than recreating detail, they have recreated action.

Make no mistake about it, *The Dam Busters* is not a dry historical simulation. It is an action game all the way, not at the expense of history, but at the expense of a few knobs and gauges.

The documentation of *The Dam Busters* is clear and concise. An appendix offers facsimiles of a message from Sir Winston Churchill, as well as a report by Wing Commander Gibson and notes on German defenses and specifications of the Lancaster bomber. I understand that the game, licensed from Sydney Development of Canada and distributed by Accolade, has received certification from the RAF—certainly a distinction not given lightly.

Graphics and sound are both excellent, game play is sufficient to tax all your arcade skills, and the strategic and physical aspects of the bombing mission itself will delight those of us who like to think about the games we play.

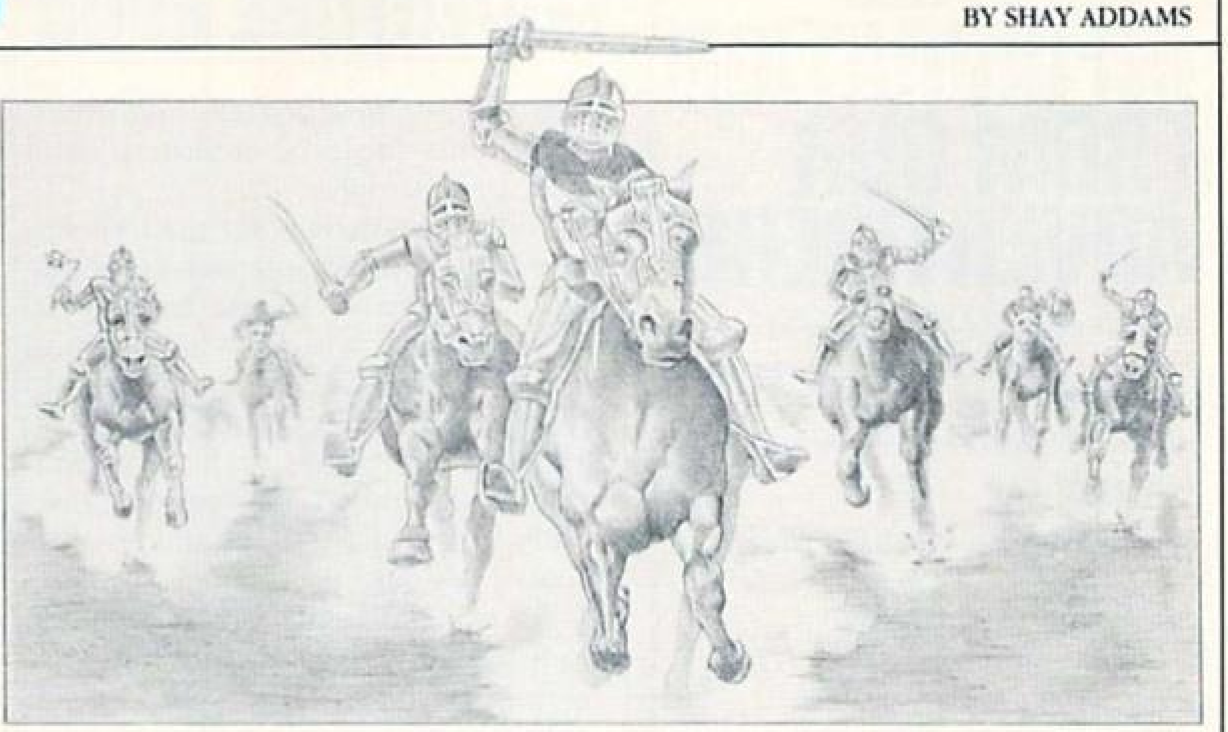
I can think of no other computer program that recreates history so well, or that reminds us of the heroism of men of only a generation ago. If gamers are fortunate, *The Dam Busters* will also be a guide to programmers in search of new themes and of new ways of stretching the limits of the home computer.

ADVENTURE ROAD

BY SHAY ADDAMS

The British are Questing! The British are Questing!

News and opinion from a leading expert in the fantasy realms known as adventure games.



Well, the British are back thanks to Mindscape, who have imported a pair of England's most popular adventures, *Lords of Midnight* and *Shadowfire.* Staged in a medieval setting, *Midnight* is an odd one. Instead of viewing the game from the perspective of a single character or a group that always travels together, you control the actions of four people who may independently move to different locations. Each may recruit other characters whose actions you can then orchestrate.

The presentation resembles a graphic adventure, but the text appears at the top of the screen rather than below, and the graphics are low-resolution which don't mix in much color. It can be played as a quest, in which Morkin must find and destroy the Ice Crown, the source of Doomdark's evil power; a strategic military-style game, in which you seek a military victory; or you can do both simultaneously. There are many ways to win, so it has extra replay value. If you enjoy military games *and* questing, you might like *Midnight.*

I had more fun with *Shadowfire,* a science fiction role-playing game that also lets you send your characters, six comic book-style superheros, to different parts of a maze rather than forcing you to keep them together. Depicted from an aerial view, this maze is composed of the corridors and rooms of an alien ship. Here you must rescue a kidnapped ambassador, capture the enemy captain, and blow up his ship. The icon-based interface is more streamlined and easier to work with than the one in Bantam's *Fourth Protocol,* and it accepts input from the keyboard, joystick, trackball—and even a light pen.

Action abounds as you guide your crew around the ship to blast aliens and robots, pick up laser rifles and other objects that are represented by smaller icons, and figure out how to operate the futuristic tools. All the goals must be accomplished within 140 minutes, and an on-screen digital clock displays a running count-down. With high-resolution graphics, *Shadowfire* is the better-looking of the pair. Unlike *Midnight,* it has some sound effects and music. Since relatively few people in England own disk drives, the programmer designed both games to load entirely into RAM so there's *no disk access* at all.

Back in the USA

Of course you still can't beat good old American know-how. Strategic Simulations just demonstrated that with *Rings of Zilfin,* a one-character role-playing quest for a pair of magic rings and a hidden treasure. I know, the plot sounds familiar—but the presentation is completely new. Most RPG's are depicted from an aerial view *(Phantasie)* or a 3D perspective *(Bard's Tale).* Here you see an aerial view of the land, but you don't guide your orc-slayer around it. Instead, you type in the direction you want to move, and the map vanishes as you watch an animated character who walks across the landscape in a scene shown from a side view. Along the way he can stop to pick up any of the eight types of local plants. Each has a different effect: some restore attributes like endurance, others prove advantageous in combat. Goblins and other monsters might attack with swords. Winged monstrosities fly overhead and must be shot down with arrows (as in the old shoot-'em up *Threshold).* Both kinds of action sequences are well-animated and reinforced with lively sound effects.

When you reach a town, it is shown with a full-screen illustration like those seen in graphic adventures such as *Transylvania.* Your character walks in, then a menu asks which building you wish to enter. The main picture remains on-screen while a window opens in the top right corner to show the interior of the store, temple or tavern as he strides inside. Another novelty: You can buy goods such as silk or toys and sell them for a profit in other towns. (Trading as a means of making money has formerly been possible only in science fiction RPG's.) Leave town and you see the map again and are prompted to make your next move.

With its unprecedented emphasis on action and such revolutionary methods of fantasy role-playing, *Rings of Zilfin* is the most original game design I've seen in years. (Strategic Simulations also recently released *Wizard's Crown,* and Avalon Hill's new title in this field is *Dark Horn.*)

Datasoft's *Alternate Reality* is a one-character role-playing game that is the first of a seven-part interlocking series. This one is set in the City, a medieval town where you've been dumped after being kidnapped by an alien spaceship. The City teems with

Continued on pg. 122

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ADVENTURE ROAD

dragons, gremlins, wizards and other fiends who must be defeated with magic or swordplay.

Trouble is, there's no goal to accomplish here; all you can do is develop a character to use in sequels like *Dungeon,* which won't be out until Christmas. Each sequel will challenge you to fulfill a quest, but until I've seen what they're like, I can't really recommend buying this one solely to prepare a character for them. (Besides, the sequels can be played as stand-alones.) If you're looking for a sequel to play right now, try *Telengard II* from Avalon Hill or SSI's *Phantasie II.*

For those who prefer to grapple with logical puzzles instead of orcs and dragons, the latest crop of text and graphic adventures, each available for the Amiga as well as the 64 and 128, holds something for all skill levels. The best-looking graphic game I've seen is Activision's *Borrowed Time,* which casts you as a '30s detective who must find the people trying to kill him. Its contemporary cartoon-style illustrations are the finest I've seen from Brian Fargo, though I was disappointed that nearly half the screen was covered with a list of nouns and verbs you can select with a joystick or mouse. This is great for people too lazy to type, buy why waste all that screen space when the computer artist is obviously so talented? The problems are best suited for first-timers and novices. (Activision has yet to match the caliber of its first adventure game, *Mindshadow.*)

Experienced crime-solvers are better off investigating the latest Infocom all-text puzzler, an intermediate-level detective game called *Ballyhoo.* Instead of playing the part of a detective, you are an ordinary citizen who gets involved in a murder that takes place at the circus. If you'd rather blast off into space, Michael Berlyn's first adventure, the all-text *Oo-topos* has been revamped as a brilliant graphics game and released by Penguin Software. "QuestBusters, the Adventurers' Newsletter," is giving away ten copies of *Oo-topos* in a contest. To enter—and get a free copy of the newsletter—just send the name of Berlyn's *second* adventure to QuestBusters, 202 Elgin Ct., Wayne, PA 19087. ■

DATA MANAGER

Continued from pg. 20

Storage size is very important. Because *Data Manager 128* uses expandable REL files, the size of files is not limited by the 128's memory. Each record can store up to 4,096 characters of information spread between 1 to 64 screen displays containing a maximum of 100 fields of no more than 255 characters each.

Best of all, *Data Manager 128* is flexible. Information can be used for mailing labels and reports as well as generating graphic representations. Sorts can be defined to suit individual needs and can include any of the fields contained in the base file. All options are activated by pull-down menus, so mastering this management program is less difficult than those which require memorizing special keystroke commands.

The program works in 80-column mode only, so each screen displays twice the information of a Commodore 64. You must use a monitor capable of displaying 80 columns; a television won't work. Easy-to-use print options make activating special features of your printer, like font choice or condensed type, a breeze.

Data Manager 128 has four minor omissions. The program's two sister programs, *SwiftCalc 128* and *Word Writer 128,* both offer on-screen help when the "HELP" key is pressed, but this feature is missing here. *Word Writer 128* also includes an on-screen calculator absent from *Data Manager 128.* Another missing option is the ability to load a file directly from the directory and the ability to dump the generated graphs to a printer. Perhaps if I hadn't seen those niceties in Timeworks other products, I wouldn't miss them.

This program is impressive and powerful, yet still an affordable professional-quality data manager which comes with a 146-page manual and tutorial. Because of the program's logical design and easy-to-use pull-down menus, most owners will be able to use *Data Manager 128* immediately. *Data Manager 128* carries Timeworks' standard money back guarantee and upgrade and exchange policy as well as free technical support via an 800 telephone connection. If you are a 128 owner in need of a professional-quality data manager, try this one. ■

MIDI MUSIC

Continued from pg. 110

Conclusions

Note that the systems I've described are only suggestions. For example, you could just as well use the Passport interface with the compatible version of Dr. T's *Keyboard Controlled Sequencer* if you don't have an external pulse clock. The important thing to remember is that any combination of compatible MIDI equipment is capable of producing truly phenomenal music.

However, you will find that music you've recorded as MIDI events will sound subtly different from the way you played it, because the system has done its own "quantizing" during the recording process. One way to fix this, within the limitations of the MIDI concept, is to move selected events forward or backward by a clock pulse or two. This is much easier to do with a good editor that gives visual as well as audio information about the MIDI events you've recorded.

If you're a performing or studio musician with some analog multitrack recording experience, you may feel very comfortable with Passport's *MIDI/8 Plus* software. You will certainly be able to extend your musical capabilities far beyond what's available with pre-MIDI equipment. However, even if you can play the music you want to hear with a high degree of accuracy, I think you will eventually find yourself wanting a convenient and complete step-time editor, because the MIDI standard of 24 clock pulses per quarter note is, in some contexts, pretty coarse time resolution.

Whether you're a musical and/or computer neophyte, I believe Dr. T's approach to MIDI music processing makes the most sense of any program I've seen for Commodore computers. I don't have equally strong reactions about the hardware in my system. The Six-Trak keyboard with its early commitment to a Commodore-compatible MIDI interface and software was a pioneering product for 64 users that still deserves attention because of its multitimbral capabilities. However, there are now several competitive multitimbral keyboards on the market. The Casio CZ-101 I've used in my own system is only one possibility.

Both of the MIDI interfaces I've used work satisfactorily. Each may require a MIDI-thru box for use with multiple MIDI devices. There are technical reasons, having to do with the way MIDI signals are sent, for using MIDI-thru boxes even with systems that don't actually require them. If you already have a non-MIDI rhythm synthesizer or other device that can be controlled with a pulse clock output, the Passport Designs interface is an obvious choice. There are several sources of sequencer programs for this interface, including Dr. T's *Keyboard Controlled Sequencer* in its Passport version, so you are not restricted to those from Passport Designs.

The Sequential 242 interface is my personal choice because I like the flexibility of an external pulse clock input. If you're totally unfamiliar with electronic construction principles, the PAIA Master Synchronizer kit and its power supply may seem like a pretty forbidding project because the assembly instructions are minimal. ■

SOUND ADVICE

Continued from pg. 106

```
    :PRINT"[SHFT J,SHFT C37,SHFT K]"'IKCT
242 WINDOW 1,17,37,22,1:RETURN'COOG
244 WINDOW 0,0,39,24:RETURN'CLYH
245 GOSUB 240'BDJG
246 PRINT"PREVIOUS SOUND NAMED:"N$'BCJN
247 B$="N":PRINT"PRINTER PREPARED
    [SPACE2](Y/N)?"B$:GET KEY B$
    :PRINT U$U$:PRINT SPC(24)B$'HTTW
248 IF B$<>"Y"THEN B$="P":GOTO 196'GIIO
249 INPUT"INPUT NAME";N$'BDMN
250 RETURN'BAQB
251 GOSUB 245'BDOD
252 IF B$<>"Y"THEN RETURN'FCCG
253 OPEN 1,4'BDWF
254 PRINT#1,"NAME:"N$'BEXH
255 PRINT#1,"[SPACE11]VOLUME: VO"VO'BERL
256 PRINT#1,"[SPACE12]TEMPO
    : TE="TE'BEDM
257 PRINT#1,"[SPACE9]ENVELOPE
    : EN="EN'BEJO
258 PRINT#1,"[SPACE6]ATTACK RATE
    : AR="AR'BEGP
259 PRINT#1,"[SPACE7]DECAY RATE
    : DR="DR'BELQ
260 PRINT#1,"[SPACE4]SUSTAIN LEVEL
    : SL="SL'BEZJ
261 PRINT#1,"[SPACE5]RELEASE RATE
    : RR="RR'BEHJ
262 PRINT#1,"[SPACE9]WAVEFORM
    : WF="WF'BENK
263 PRINT#1,"[SPACE6]PULSE WIDTH
    : PW="PW'BEIL
264 PRINT#1,"[SPACE4]FILTER ON/OFF
    : FI="FI'BEXM
265 IF FI=1 THEN PRINT#1,"[SPACE9]
    CUTOFF FREQ ="CF'EHPP
266 IF FI=1 THEN PRINT#1,"[SPACE5]
    LOW PASS FILTER ="LP'EHKR
267 IF FI=1 THEN PRINT#1,"[SPACE4]
    BAND PASS FILTER ="BP'EHES
268 IF FI=1 THEN PRINT#1,"[SPACE4]
    HIGH PASS FILTER ="HP'EHVT
269 IF FI=1 THEN PRINT#1,"[SPACE11]
    RESONANCE ="RE'EHXT
270 PRINT#1,"EXAMPLE:"'BCQG
271 PRINT#1,"10 ENVELOPE "EN","AR",
    "DR","SL","RR","WF","PW'BQDN
272 PRINT#1,"20 VOL "VO'BEYI
273 PRINT#1,"30 TEMPO "TE'BENJ
274 IF FI=1 THEN PRINT#1,"40 FILTER
    "CF;","LP;","BP;","HP;","RE'ETTR
275 PRINT#1,"50 PLAY";CHR$(34);
    "V1 O4 T"EN" X"FI" <FOLLOWED BY
    SELECTED NOTES>";CHR$(34)'DRBA
276 PRINT#1:CLOSE 1'CDLK
277 GOSUB 244:PRINT CHR$(19)
    :RETURN'EJRO
278 DATA T2,T5,T6,T4,Q'BNOO
```

END

HEART OF AFRICA

Continued from pg. 26

stayed home. If you run low on store-brought gifts, you might try giving away emeralds or other precious minerals you've found in the jungles or mountains. And if all else fails, go for your gun and talk to them in a language everyone understands: Smith & Wesson. (But don't count on winning the game by saying "Make my quest!" to every native you meet.)

Trekking from North Africa to the Cape of Good Hope consumes a lot of time, and success hinges on putting together the clues you find in different places. This would require extensive note-taking were it not for the exceptional "diary" feature. Each time something important happens, a diary window opens and shows a pen writing notes on the event in your journal. Later on you can punch the diary icon and thumb through its pages to refresh your memory.

And you won't even have to draw a map to record your findings, for the program automatically keeps charts of your progress. When you select the right icon, a window opens and shows a color map of your immediate location and the areas you've explored so far. The auto- mapping constitutes more than mere special effects: If the game's entire map of Africa were drawn according to the same size it appears on-screen in individual segments, it would cover a wall 10 by 20 feet! This pair of remarkable features take full advantage of the computer's capabilities, so you can concentrate on the game while the machine does the dirty work. And isn't that what computers are for?

Another thing I like about this game is that it offers more than one goal. Though you're constantly aiming to find the tomb, you can make money by discovering things such as the source of the Nile or an unknown mountain. This reinforces the game's sub-theme: exploration for the sake of knowledge. To collect on such discoveries, you must report them to the executors of Primm's will, who hang out in the half-dozen port cities around the coastline. You can also raise cash by selling minerals in the interior towns of Timbuktu or Khartoum. You'll have to visit a port town when you want to save a game, for this can only be done in a port. Up to ten games in progress can be saved on a separate disk.

Numerous sound effects and brief tunes enliven the quest, which must be finished in five years of game time. The program packs extra replay value, for it conceals the tomb in a different location for each new game. The manual contains plenty of clues and hints, and you get a big fold-out map of Africa that shows the port cities as well as some of the major rivers and other terrain.

An ever-intriguing continent of danger and discovery awaits the intrepid adventurist who enjoys expeditions into the unknown but has grown weary of dungeon-style fantasies. And the authors, Dan and Bill Bunten, deserve a medal (the Purple Orb, maybe?) for their idea of rewarding the player for making geographic discoveries instead of paying them for slaying everything that moves.

NEWSROOM

Continued from pg. 47

you've saved. When you reach one you'd like to place in a particular space, press the button and it's sited there. When the whole page is designed to your satisfaction, again save it to disk.

Of course you don't have a real newspaper without a printout, so you really must have a compatible dot-matrix printer to fully appreciate this program. (A letter-quality printer won't duplicate these graphics.) Tell the computer what printer and interface you're using. *The Newsroom* is compatible with about 34 printers, including Commodore, Epson, and C Itoh.

Another innovative menu option is the ability to electronically send your stories to other computers using *The Newsroom*. (I couldn't test this option, but it sounds intriguing.) The beauty of this is that if your friend has an IBM PC and you have a Commodore 128, your friend could use the IBM version of *The Newsroom* and you could use yours, but you could still swap stories and information.

There is a lot of disk-swapping in this program—which is unavoidable, considering its comprehensive scope. For example, if you want to lay out a page, go to "layout" on the main menu, but to access any of your files, you must switch to the data disk on which you've saved those files. Then you'll have to go back to the main menu if you want to print—and again to the data disk to tell it what to print.

Between the program disk, the clip art disk and the data disk you've made, you're constantly swapping back and forth. And if you're not satisfied with the more than 600 graphics offered on the clip art disk, you can also purchase an additional clip art disk from Springboard, bringing the total to four disks to swap.

But this constraint really didn't bother me, because the screen continually told me when to insert which disk, so I was never confused about what to do next. And if I accidentally tried to save on the main disk, it didn't let me. (Thank goodness.)

What about the manual? Many computer programs are painstakingly designed and created, then the manual is thrown together at the last minute. Definitely not true in this case. Though you can run this program through trial and error because instructions are provided on-screen, I recommend that you read the manual to save time and fully exploit its entire range of capabilities. The manual also includes some valuable extras, such as key definitions and proofreading symbols, as well as some very helpful references on journalism. The "Complete Guide to Creating a Newspaper" section of the manual is very factual and informative, and covers finding topics, investigative reporting, and strategies for getting interviews.

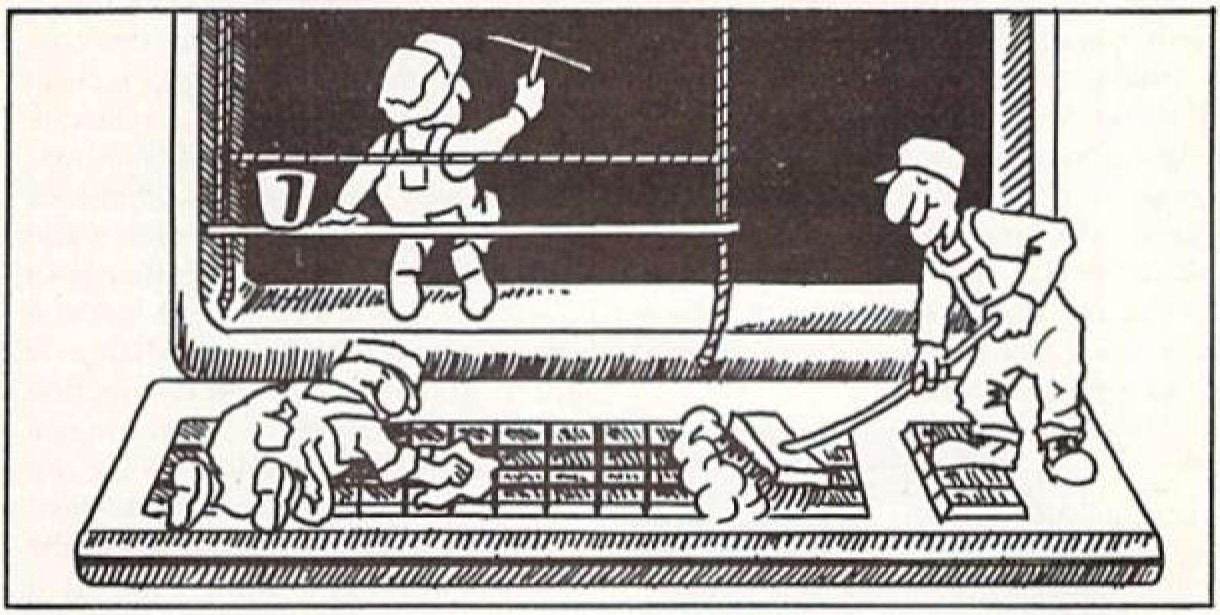
Maybe the kids using *The Newsroom* will become cub reporters and later on famous journalists—but then again maybe they won't. But they (and you) will have plenty of fun on the way. *The Newsroom* is a fascinating and exciting learning experience, and on a scale of one to ten, I'd give it an eleven!

64 USERS ONLY

BY JEFFREY HERSK

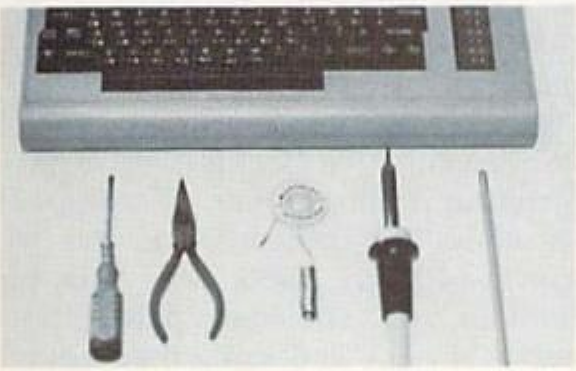
Keyboard Cleanup

The instructions here for cleaning the keyboard contacts on your Commodore 64 are clear and useful, but new owners please be warned: OPENING YOUR COMPUTER WILL VOID YOUR WARRANTY. If your warranty has already expired, you must still be very careful in performing this operation. Commodore Power/Play *takes no responsibility for the results of surgery on your computer.*



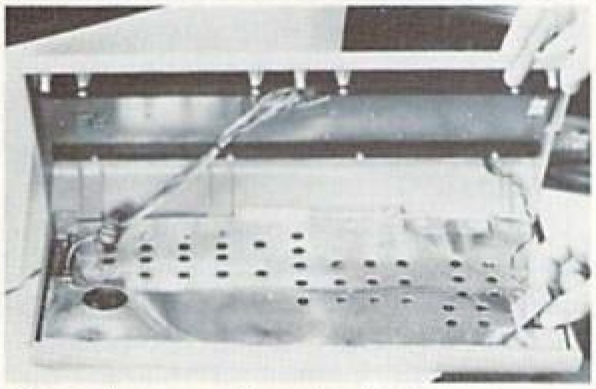
Commodore computing is lots of fun, but the enjoyment can be easily spoiled if your keyboard develops "personality problems."

On my 64, it all started with the "2" key. Sometimes the key would work, sometimes it wouldn't. This became really frustrating when using quotations (shift-2) in programming. If one of my quotation marks did not register on the computer, I would find myself in quote mode when I was not supposed to be, and out of quote mode when I wanted to be in it. Cursor movements and editing in the wrong mode created major messes in my programs. I was driven to do something drastic...I opened up my 64! I managed to squash the bug in my "2" key and, in the process, learned a little about the innards of this fine machine.



Here are all the tools you will need for the job.

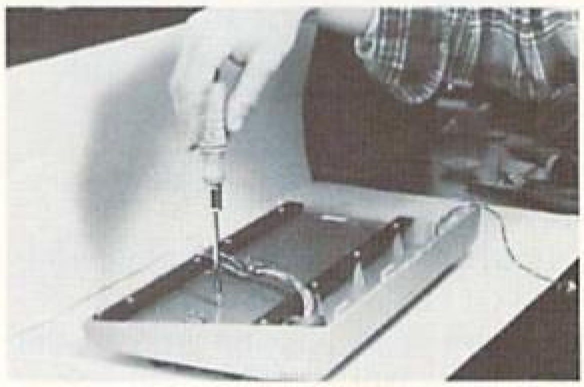
The only tools necessary for the job are, a small Phillips screwdriver, needle-nose pliers, a soldering iron, electrical solder, a desoldering braid, and an pencil eraser.



Open the case and unplug the two wire bundles.

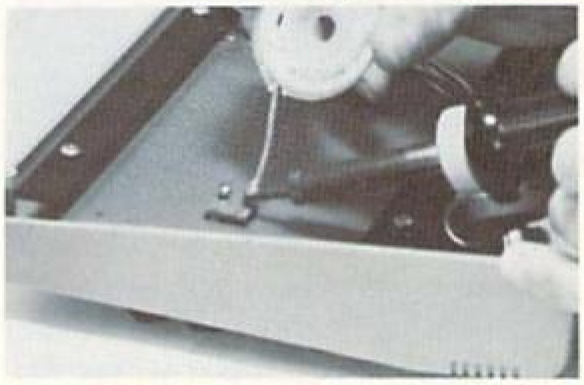
Cleaning the keyboard contacts on the 64 is a relatively simple task, which I would encourage anyone with a reasonable amount of handiness to try. The only tools necessary for the job are, a small Phillips screwdriver, needle-nose pliers, a soldering iron, electrical solder, a desoldering braid, and an ordinary pencil eraser.

Begin by disconnecting all the cables coming out of the computer. Then flip the unit upsidedown (gently!) onto a soft surface, and remove the three screws from the base. Lift the base upward and separate the computer into two halves. If you have never disassembled a computer or other expensive gadget before, your heart may be pounding at this point. Never fear! It was built by a human, wasn't it?



Remove the screws holding the keyboard assembly together.

Alright, you now see that the two halves of the computer are connected by two bundles of wires, one large and one small. The large bundle carries information from the keyboard to the processor, the small bundle carries power to the power-indicator LED. Both can be disconnected from the main circuit board by gently wiggling and pulling on their plug ends. Do that now. Take your time and be careful not to bend any of the pins.

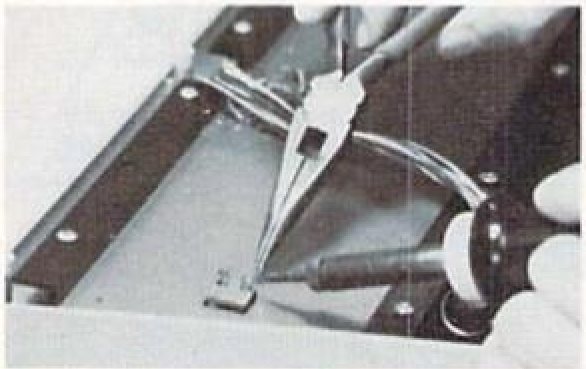


Use the braid to desolder the shift-lock key wires.

When the wires are disconnected, you can set the base of the computer aside and go to work on the keyboard. Begin by removing all the tiny brass screws holding that brown plastic board. This is the printed circuit board (PCB) for the keyboard. I counted about 22 of the little screws.

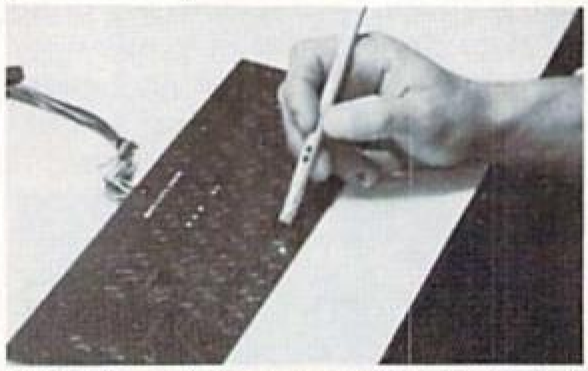
Some may be hiding under the large wire bundle.

Right now is a good time to plug in your soldering iron and have it warming up while you contemplate your next move. Your task is to desolder those two bare wires you see soldered to that little gray box. The box is the shift-lock switch, and the wires tell the computer whether the shift-lock key is pressed or not.



Keeping the connection hot, pull each wire free.

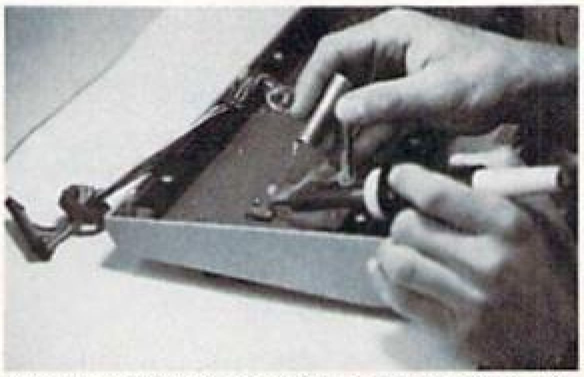
Hold the end of the desoldering braid on one of the soldered connections and apply the hot iron to the braid. You will soon see the solder melt and flow into the braid. Remove the heat and give a little tug on the wire with your needle-nose pliers. If it does not pull free, apply the braid and heat and try again. When you have succeeded in pulling the wire free, repeat the process on the other wire. When you have that one free, you're ready for the real work.



Polish the contacts thouroughly with a pencil eraser.

Lift up the keyboard PCB and flip it over. These gold dots you see are the keyboard contacts. This is where the connection is made when you press a key. Any dirt, dust, moisture, or corrosion here can foul up the operation of the keyboard. So take your pencil eraser in hand (the little one on the end of a pencil works well), and start scrubbing those contacts. If you want to, you can look at the keyboard and figure out which contacts belong to a particularly troublesome key, and give that one a little extra oomph.

When you finish cleaning the contacts, wipe the board off with a clean cloth, and you're ready for reassembly. Replace the PCB and all those little screws. Now insert the shift-lock key wires into their little holes and solder them in place. Remember your basic rules of soldering: Have the iron hot and tinned with a thin layer of solder. Apply heat to the connection until it is hot enough to melt the solder. Then touch the solder to the hot connection. The solder should flow and coat the end of the wire and the terminal, leaving a shiny blob. If it doesn't, heat it up some more and try again.



After re-soldering the shift-lock key wires, reverse the procedure for reassembly.

Now plug the two wire bundles back into the main board. The large plug will fit only one way, determined by a missing hole on the plug which corresponds to a missing pin on the board. Wiggle the plug gently into place to avoid bending any pins. To determine the proper orientation of the small plug, look for a small number "1" on the plug which will correspond to a "1" near one of the pins.

With these connections made, you're ready to put the case back together and take her for a test drive. Turn the system on. Did the power-indicator LED come on? If not, you may have connected the plug backward. No harm done, you just have to go back inside and reverse it. Now try out the keyboard. All the keys should respond to a quick light touch. Isn't that neat? Finally, try the shift-lock key to be sure you got a good connection on your soldered joints.

If all went well, give yourself a pat on the back. (Be careful not to break your arm.) Your keyboard is performing like it did when it was new. And your self-esteem has gotten a boost from using your own skills and ingenuity to solve a problem.

Continued from pg. 28

The Skater's Edge

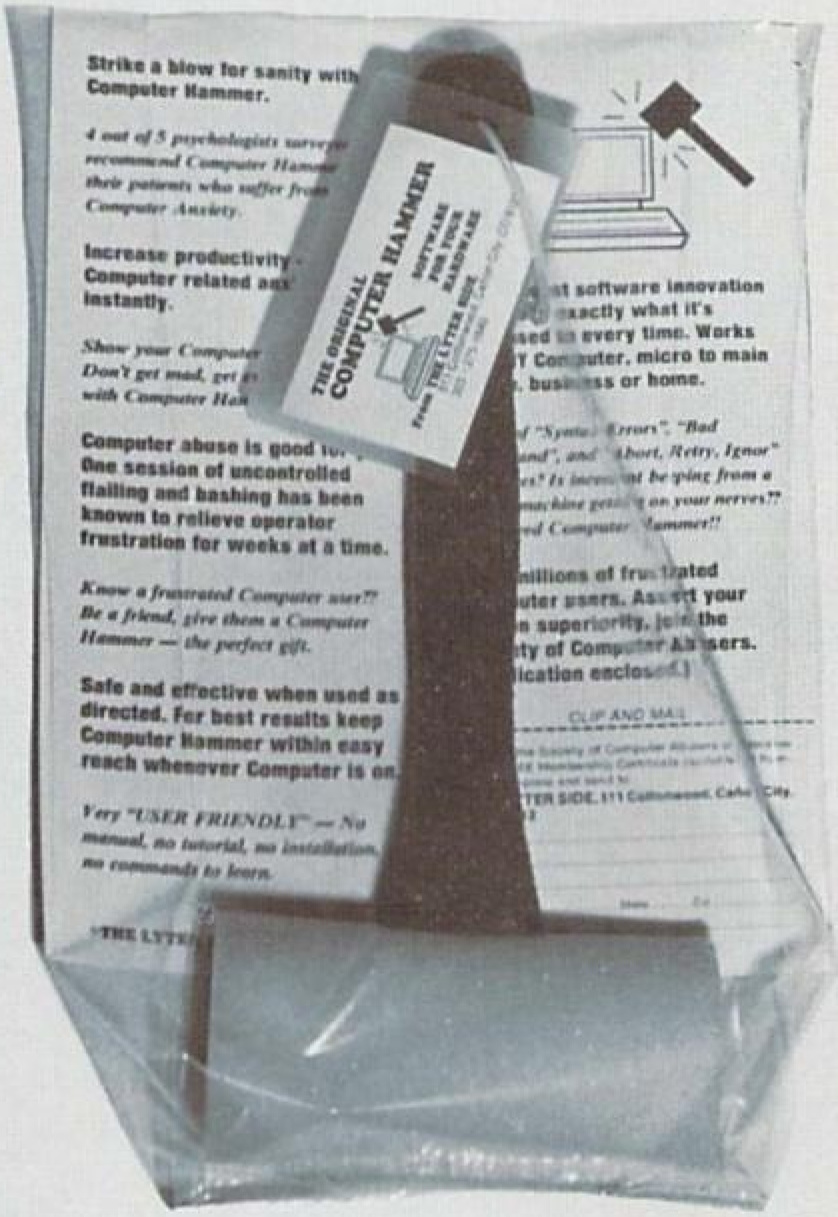
- The height and strength of a shot is determined by how long the fire-button is depressed. In most cases, it's a good idea to squeeze the button from the moment you get the puck on your stick. Then, even if you are surprised by a quick moving opposing player, you will be ready to release a more powerful blast in short notice.
- As in professional hockey, most infractions tend to go unnoticed by the officials. A tripping penalty, for instance, will only be called about one out of every ten times it is actually committed. So, to gain a temporary manpower advantage when attacking or defending, simply send someone flopping with an "illegal" check. The odds of getting caught are slim.
- When taking an obstructed shot on goal, don't move in too close to the net. In the event that the goalie does make a save, most rebounds tend to bounce back to the high slot. You don't want your man to be caught too deep. And remember, if the area gets a little congested, don't be afraid to level some opposing players to clear some room.
- If you're lagging way behind a computerized player in a dash up ice, move your skater in the opposite direction until he disappears off of the back end of the screen. Then, as the screen continues to pan up ice, wait for another one of your defenders to appear in front of the onrushing opposing attacker. The program will instantaneously switch control over to this new player, allowing you to quickly secure a tight check.
- To gain the competitive edge during center ice face-offs, pause momentarily when the puck is dropped to allow the computer's center to gain possession. Then, as he cuts in front of your stationary player, put out your stick and bring him to the ice. This will temporarily immobilize him, allowing you to pick up the puck and rush for the net.

Take note that this particular strategy will not work on a face-off deep in either zone. When the puck is dropped here, the opposing player will race to the high slot and fire immediately. Be sure to react quick enough to keep him covered.

COMMODORE'S NEWS FROM THE BACK

Relief for Computer Frustrations

The Lyter Side has released a piece of computer software that is inexpensive, does exactly what it is designed to do, requires no user manual, no operator training time, and whose appropriate utilization is intuitive to every operator. It is the Original Computer Hammer, a foam rubber hammer designed to bring safe relief for the operator frustrations every computer user is familiar with. It retails for under $10.00. (The Lyter Side, 511 Cottonwood, Canon City, CO 81212)


Strike a blow for sanity with Computer Hammer.
THE ORIGINAL COMPUTER HAMMER
SOFTWARE FOR YOUR HARDWARE
from THE LYTER SIDE
Increase productivity
Computer abuse is good
One session of uncontrolled flailing and bashing has been known to relieve operator frustration for weeks at a time.
Safe and effective when used as directed. For best results keep Computer Hammer within easy reach whenever Computer is on.
CLIP AND MAIL

FORTH Interest Group

The FORTH Interest Group (FIG) is a non-profit organization with over 5,000 members and 80 chapters worldwide devoted to the FORTH programming language. Most chapters meet monthly and provide a way for the novice to find out what the language is all about. They are also a place for experienced programmers to share ideas.

FIG publishes **FORTH Dimensions,** a bi-monthly magazine which is provided free to members. Health insurance, an on-line data base, free reference materials, a job registry and a large selection of FORTH literature are a few of the other services available. Membership is $20. (FIG, P.O. Box 8231, San Jose, CA 95155)

Utility Kit

The **Vorpal Utility Kit** for the Commodore 64 from Epyx includes a head-alignment program for the 1541 disk drive, a file-saver utility which can recover erased files from disks, and super-fast disk formatting and backup utilities. Other features include Epyx's own **Vorpal** save and load utilities for user-created programs. **Vorpal** allows programs saved in Vorpal format to load up to 25 times faster than normal by placing user-created files and programs in a special fast-loading format. Unlike the **Fast Load** cartridge from Epyx, **Vorpal** will not speed the loading of "off-the-shelf" programs and games purchased from software manufacturers. (Epyx, 1043 Kiel Court, Sunnyvale, CA 94089)

Boston Computer Diet Correction

In Christine Adamec's "Physically Fit with Your Commodore 64" (February/March **Commodore Power/Play**), we mistakenly said that the **Original Boston Computer Diet** package comes with extra disks so data for additional people can be saved. According to the manufacturer, additional disks are available, but separately, at a cost of $10 each.

Free Guide to Home Automation

SmartHome Shopper is offering a free 24-page guide to home automation. **Home of the Future Design Kit** shows how to use existing home wiring to integrate automated control products into your home. The Guide explains "smart home" terminology and includes descriptions of home control. Write to SmartHome Shopper, 274 East Hamilton Avenue, Suite B, Campbell, CA 95008, or call 408-559-3788.

SPIDER TRAP

Continued from pg. 87

```
1152 DATA 173,1,220,74,176,3,206,1,
     208,74,176,3,238,1,208,74,176,42,
     173'BLVN
1154 DATA 0,208,208,31,173,16,208,41,
     1,208,16,173,16,208,9,1,141,16,
     208'BLAP
1156 DATA 169,80,141,0,208,96,234,234,
     173,16,208,41,254,141,16,208,
     206'BKXR
1158 DATA 0,208,96,234,234,74,176,32,
     238,0,208,240,30,169,80,205,0,
     208'BKRT
1160 DATA 208,20,173,16,208,41,1,240,
     13,173,16,208,41,254,141,16,208,
     169'BMFM
1162 DATA 0,141,0,208,96,234,234,173,
     16,208,9,1,141,16,208,96,234,
     234'BJVN
1164 DATA 32,60,3,32,60,3,32,60,3,32,
     60,3,96'BJYK
1170 REM    SMITH SPRITE DATA1'BQDG
1172 DATA 0,0,0,0,60,0,4,255,0,4,235,
     0,4,20,0,4,20,0,5,255,80,5,255,
     80'BKAO
1174 DATA 0,255,16,0,60,16,0,60,16,0,
     60,16,0,40,0,0,60,0,0,60,0,0'BFAP
1176 DATA 60,0,0,56,0,0,48,0,0,48,0,0,
     48,0,0,32,0'BOEO
1180 REM    SMITH SPRITE DATA 2'BQEH
1182 DATA 0,0,0,0,60,0,0,255,16,0,235,
     16,0,20,16,0,20,16,5,255,80,5,
     255,80'BOXQ
1184 DATA 4,255,0,4,60,0,4,60,0,4,60,
     0,0,40,0,0,60,0,0,60,0,0,60,
     0'BGJQ
1186 DATA 0,44,0,0,12,0,0,12,0,0,12,0,
     0,12,0'BJPO
1190 REM    SPIDER SPRITE DATA'BQUI
1192 DATA 0,0,0,0,0,0,64,0,1,80,0,5,
     68,0,17,65,0,65,0,170,0'BYYO
1194 DATA 0,170,0,170,130,170,128,170,
     2,128,170,2,131,40,194,12,40,
     48'BJPS
1196 DATA 48,40,12,48,0,12,48,0,12,48,
     0,12,0,0,0,0,0,0,0,0,0,0,0,0'BGFT
1200 REM    MICHIGAN SPRITE DATA'BSQA
1202 DATA 0,10,0,0,42,0,0,37,0,0,37,0,
     0,37,0,0,164,0,0,4,0,5,255,
     212'BIFI
1204 DATA 5,255,212,0,255,192,0,63,0,
     0,63,0,0,63,0,0,63,0,0,42,0'BEUJ
1206 DATA 0,51,0,0,51,0,0,51,0,0,51,0,
     0,51,0,0,34,0'BQUJ
1210 REM    SAVE ME SPRITE DATA'BQOB
1212 DATA 0,0,0,0,0,0,28,228,156,16,
     164,144,28,228,152,4,163,16,28,
     163,28'BNTK
1214 DATA 0,0,0,0,0,0,0,0,0,32,159,24,
     49,144,24,42,144,24,36,156,
     24'BHWL
1216 DATA 36,144,24,32,144,24,32,144,
     0,32,144,0,32,159,24,0,0,0,0,0,
     0'BJON
```

END

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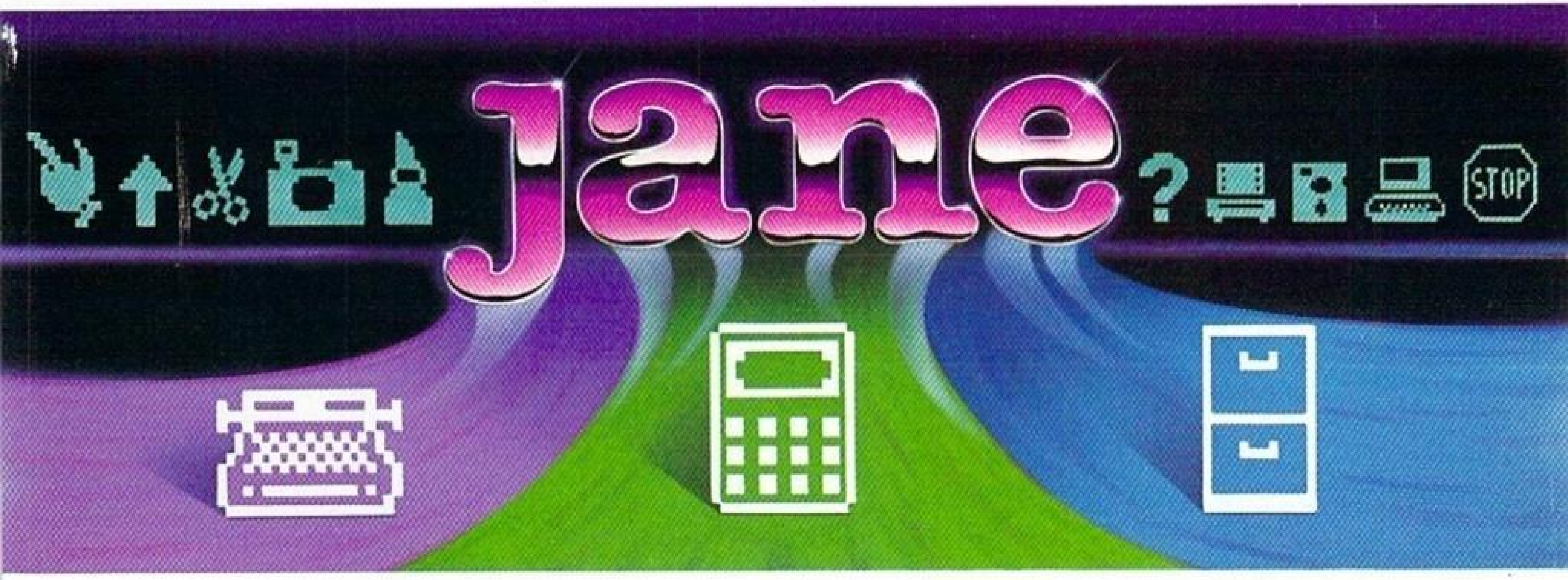

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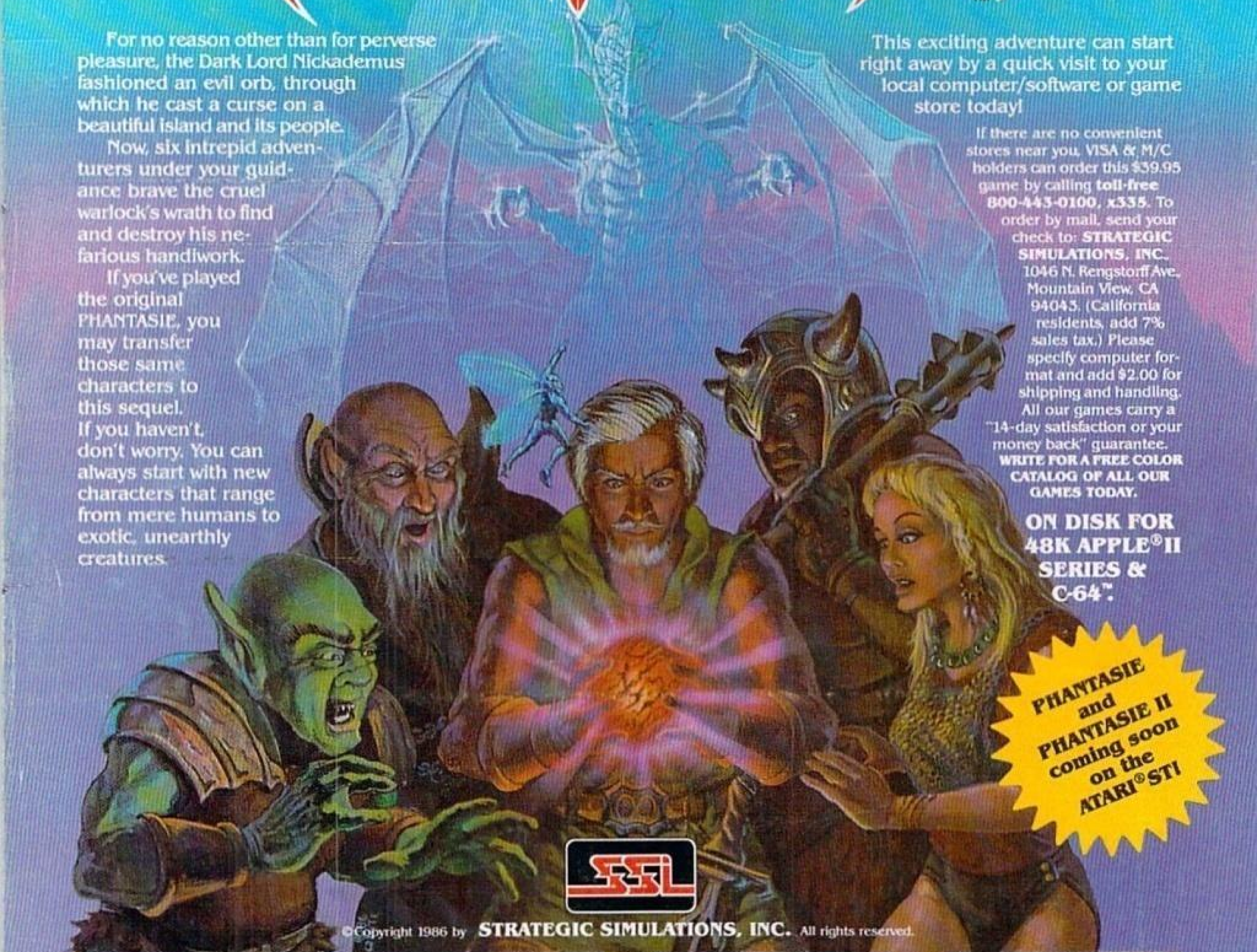

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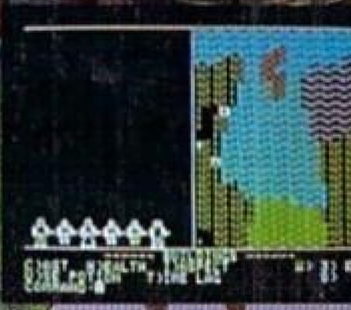
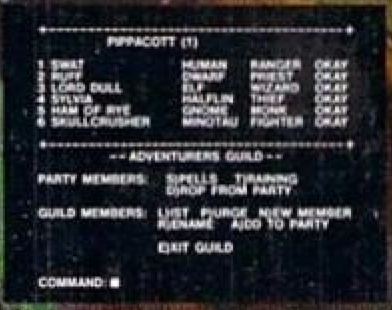


A small section of the wilderness your band must explore.



```
PIPPACOTT (1)

1 SWAT           HUMAN    RANGER   OKAY
2 RUFF           DWARF    PRIEST   OKAY
3 LORD DULL      ELF      WIZARD   OKAY
4 SYLVIA         HALFLIN  THIEF    OKAY
5 HAM OF RYE     GNOME    MONK     OKAY
6 SKULLCRUSHER   MINOTAU  FIGHTER  OKAY

-- ADVENTURERS GUILD --

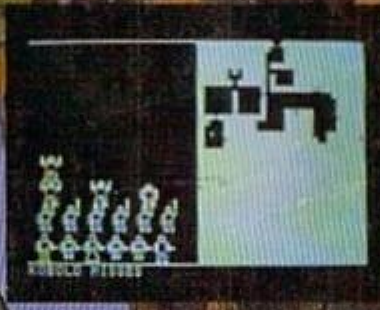
PARTY MEMBERS:  SPELLS  TRAINING
                DROP FROM PARTY

GUILD MEMBERS:  LIST  PURGE  NEW MEMBER
                RENAME   ADD TO PARTY

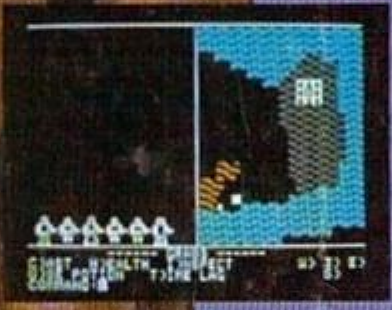
                EXIT GUILD

COMMAND: ■
```

A sample of recruits from the Adventurers' Guild.



You must map out dungeons and fend off hideous monsters.



Your group has found Pluto's Palace in the Netherworld.

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